AMERICAN AGRICULTURIST

FOR THE

FARM · GARDEN · & · HOUSEHOLD

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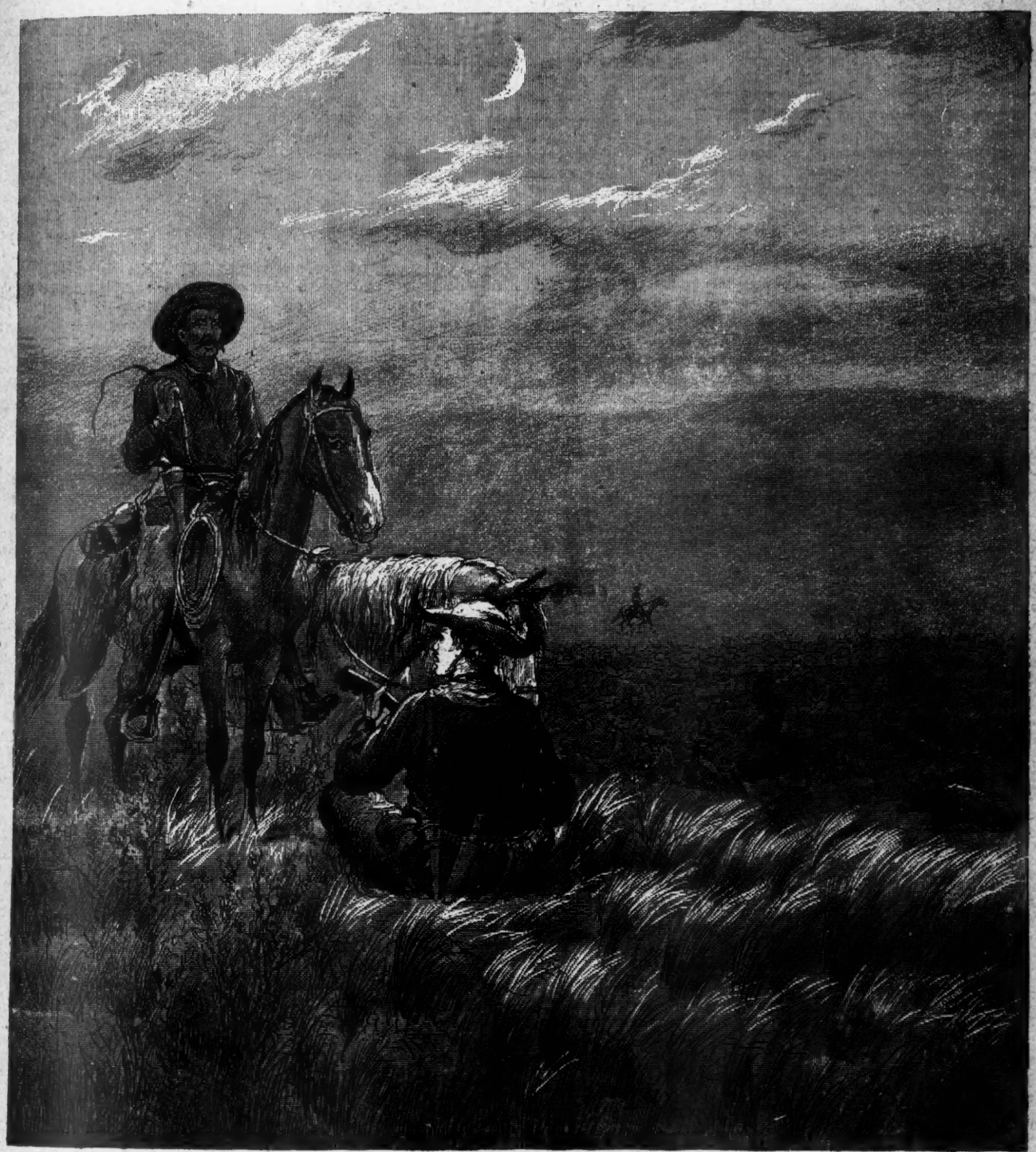
VOLUME XLIX.—No. 7. NEW YORK, JULY, 1890. NEW SERIES—No. 522.



A NOCTURNAL DUET ON THE RANGE.

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CATTLE RAISING IN THE NORTHWEST.

F. W. ANDERSON, MONTANA.

COWBOYS have for years excited admiration in the hearts of the small boys of the country and, it is feared, in the hearts of many romantic big boys also. What with his picturesque costume—chiefly leather and buckskin, cut into strips, big boots, spurs, bowie knife, revolvers, a belt full of forty-five or fifty caliber cartridges about his waist, and a flapping sombrero on his head, all of which features may be found in any picture of the "typical" cowboy, he seems to be quite a romantic and desperate looking character. But old cowboys nowadays usually leave most of these things for the novice to trick himself in, and content themselves with boots, overalls, flannel shirt, silk handkerchief knotted about the neck, and a broad-brimmed felt hat for the head. The cowboy has been set down as a roving, reckless fellow, up to all kinds of mischief when off duty and likely to shoot a man any day for breakfast. But of our Montana cowboys it has been truly said they own all the way from one hundred to five thousand head of cattle each, and look well after their bank accounts.

In northern Montana there are only a few of the heavy "cattle companies," most of the stock being owned by private individuals in bunches of from fifty up to several thousand head. The cattle roam over the ranges at will excepting during round-up seasons—in the spring and fall. In an unusually good season, when feed is plentiful and the steers fatten early, there is sometimes a summer round-up for the purpose of collecting the fattest steers for shipment. It requires systematic and careful work to bring together all the stock in a section of country probably seventy-five miles long by thirty miles wide. In order to do this easily and cheaply the owners band themselves into "associations," and at the proper season meet together to plan for the round-up. Each owner is assessed a certain sum always in proportion to the number of cattle he has on the range. This money goes toward defraying the various expenses of the round-up, such as the furnishing of the mess-wagon, wages of the cook and extra men, the building and repairing of range, corrals, etc. At this meeting also a member of the association is elected captain and the others pledge themselves to obey his orders so long as the work lasts. It is his duty to see that everything is done properly and fairly and to make all necessary arrangements for the season's work. Frequently, a secretary is chosen also, whose duty it is to record the sum total of each brand of stock driven into the corrals and branded, and to keep account of all expenses. At this same meeting the mavericks are sold to the highest bidder, but no man is allowed to bid who does not belong to the association. This highest bidder agrees to take all the mavericks found during the round-up. As they are found his private brand is placed upon them and they are turned loose again to go bellowing after the branded herd. A maverick is an unbranded animal, presumably without an owner, and is most commonly a yearling which has been accidentally overlooked at a previous round-up.

The association meeting is over; the captain has perfected his plans. The covered mess-wagon is on the trail, making for the first camping place at a good rate. The herd of extra horses with their herder are headed for the same place, while the stalwart cattle-men, cowboys if you will, some grave and silent, others noisy and hilarious, but all in good humor, seated on their cayuses, jog along at an Indian trot several miles ahead. The creek or river on whose verdant banks they are to camp that night and probably the next is reached; the wagon containing the precious "grub" comes to a standstill; the herd of horses comes galloping down the hill to drink long and deep of the hurrying water. A fire is soon blazing and presently the old black coffee-pot exhales a fragrant odor, and the smell of frying meat proclaims that supper is not far off. Seated on their saddles or reclining on the ground, "the boys" eat a hearty supper (see Fig. 1). The night-herder relieves the day-herder who, weary and hungry, sits cross-legged eating and drinking till he bursts a button. Then, grouped about the fitful blaze of the fire, stories are told, cards played, and the solitary banjo, or it may be guitar, is strummed, while some of the younger men sing of love and war, or of the Eastern homes and the girls they left behind them not yet forgotten. The fire burns low; tired men roll up in their blankets, pillow their drowsy heads on saddles and presently silence reigns supreme, broken only by the occasional snore of a heavy sleeper. The silvery moon rising above the hills looks down on the peaceful camp and the rippling stream, intensifying the silence and deepening the shadows. The sudden and hideous howl of a distant coyote seems to make the evening air more chilly, and while the night-herder takes a fresh chew of tobacco and buttons his coat tighter he curses the whole race of coyotes until he is literally "hot in the collar."

The cook rolls out before daylight, and by sunrise all have had their breakfast, mount their horses ready to begin the round-up in dead earnest. Being camped near the lower end of their range they start out singly, or in pairs. Drawing an imaginary line through the center of the mess-wagon straight across the range, they travel in radiuses until they have formed a line across the lower end of the range from corner to corner. Then each man starts back, riding around and gathering up every bunch of cattle big or little that he finds, slowly driving the whole lot toward camp. As each man does this it is evident that practically all the cattle at this end of the range are "rounded-up" and brought together. If the cattle are known to be very numerous, matters are so calculated that a certain number of men shall meet at given points, between camp and the end of the range, bring their bunches together and all assisting in driving the band to camp, as the cattle when numerous, can be more easily driven in a large band by half a dozen men than they could be in smaller bands each of which might be too large for easy management by one man. By the time night comes, if things work well, the cattle are grazing near camp, or lying down chewing their cud, while the line-riders quietly sit watching, or move slowly about. In our frontispiece one cowboy, seated on the ground, is playing his guitar, while another on horseback, deputed to be a line-rider, is singing to the accompaniment, and right well many of the cowboys can sing too. But sometimes it happens that a man has a broken, consequently a difficult, country to work over. Having to examine every ravine where cattle might be hidden, and to travel slowly with his bunch of cattle, possibly fractious to drive, which are constantly trying to run out of the drove and escape, he may not reach camp till midnight or even later. When a large band is brought together as described, several men are needed to watch it at night. These men ride slowly around the band at a little distance during the night—just far enough off to keep the band together and drive the stragglers back. Watch is changed every four or six hours so that all may have their fair share of work as well as rest. The next morning camp is broken, and while the mess-wagon proceeds to the next convenient camping place the cattle already collected are allowed to graze slowly along—just fast enough to keep moving—headed for the next camp. At this rate they will travel from six to ten miles a day. The men not employed in driving the band, instead of starting at once for the new camp as they did in the first instance, spread out across the width of the range and advance, gathering up all the cattle they can find, reaching the new camp with the results of their labor, some perhaps in the middle of the afternoon, others not till dark, according to the number of cattle they fall in with and the kind of country traversed. By this time, probably, the band has become large and must be carefully watched, for a thunder storm, or other disturbance, might cause it to stampede and scatter, in a single night, to the four winds.

We will assume that the next camp is made close by one of the round-up corrals. Now comes the busy and exciting time. When all the cattle in the vicinity have been collected they are allowed to become quieted. Early in the morning the branding irons are brought out and kept hot. The great herd is peacefully feeding a few hundred yards away. The line-riders are slowly riding back and forth on their appointed sides. All is ready. Several men now ride slowly into the herd and gradually work to the outer edge a goodly bunch of cows and calves, taking as few steers as possible; these they drive over to the corral. Of course some cows will be driven off without their calves and *vice versa*. Such, hearing the bellowing of their mothers, or offspring, will try to break away from either side, as the case may be, in order to rejoin their kindred. Men are stationed to keep any from escaping from the small bunch, while the few that want to join it from the main herd are allowed to do so. Then the small bunch is driven into the corral. The calves are lassoed by the neck or feet, usually nowadays by a hind foot and as gently as possible turned over on their sides. The hot branding iron of their particular owner is then speedily pressed on the proper spot, burning the skin deeply enough to leave a permanent scar or "brand," which will not become overgrown with

hair for years. (See Fig. 2.) Castrating is performed at this time also. The secretary notes in his book the number of calves branded each day and to whom they belong. Occasionally a full-grown animal is found that has never been branded, and there is an exciting time to throw and overcome the frightened creature. When the branding is over the animals are turned out to feed and are carefully herded separately from the big band. In the meanwhile another bunch is being got ready for the corral, and so it is kept up all day and often for nearly a week, until all are branded and recorded. This arduous task being accomplished, men are detailed to drive the whole band back to the lower end of the range again and allow it to split into small herds which wander about till they reach once more their favorite haunts. The camp is broken and a new one made, and so on until another band has been collected and another corral reached, where the same operations are repeated until at last the upper end of the range is arrived at and the work of the "round-up" is done. Besides branding the calves during round-up the fat steers are "cut out" and driven to the nearest railroad point for shipment.

The breeds of cattle most commonly seen are Shorthorn, Polled Angus, Holstein and "American cattle"; but the old-fashioned, bony, hollow-sided, big-headed, long-horned Texas steer is not to be found, unless some have been shipped in recently, for our Montanians prefer raising good stock. The animal and vegetable enemies of cattle are the same as those of the sheep. Pleuro-pneumonia is sometimes imported with cattle from the States, but is soon wiped out. The Indians and white thieves used to steal a great many cattle, but a few wholesale hangings have almost put an end to cattle stealing. Altering brands is a favorite pastime with some dishonest persons; but woe unto the man caught altering a brand.

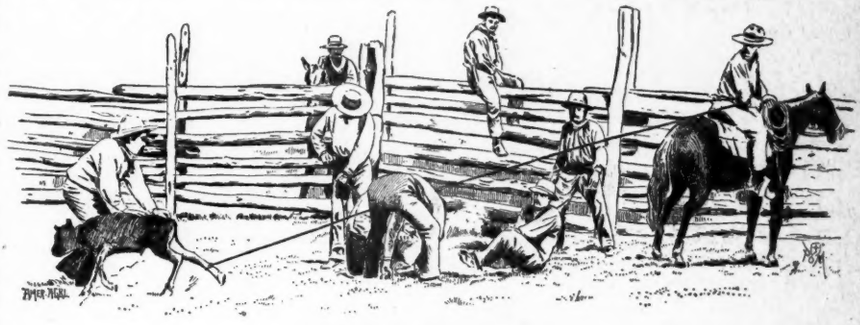


FIG. 2. BRANDING CALVES.

MANURE APPLICATION FOR MONEY ONLY.

T. GREINER, NEW YORK.

The production of cereals and other common farm crops pays only where good yields are obtained from plant food, procured at no extravagant cost, and applied without waste. By the free use of manures we can easily enough bring our wheat yields up to thirty-five, forty, or even more bushels per acre, and our oat yields to seventy or eighty bushels, or upward. The question then will be only not at what profit, but at what cost. The matter assumes a somewhat different aspect when the soil itself supplies a considerable share of the plant foods, and we have a chance to procure those that are needed in addition at a comparatively low cost. Here we may find quite a margin for our own pocket in the transaction. Wheat, barley, oats, corn, buckwheat, etc., have been the staple crops on many of our common grain farms for generations, and barnyard manure the only fertilizer ever used. All these cereal crops remove from the soil, in grain and straw, more potash than phosphoric acid. A wheat crop of thirty bushels per acre requires about twenty-two or twenty-three pounds of phosphoric acid, and about twenty-eight pounds of potash. The grain alone, however, contains nearly twice as much phosphoric acid as potash. So also do all the animal products of the farm. Every load of grain, every can of milk, every horse, cow, sheep, or hog sold off the place removes a great deal more of phosphoric acid than of potash. The majority of northern farms, of which the articles mentioned constitute the usual productions for market, are fertilized almost exclusively with barnyard manure, an average fair sample of which contains about ten pounds each of nitrogen and potash, and only four or five pounds of phosphoric acid per ton. The potash has gone more largely into the straw and grasses, etc.; and it finds its way into the manure, and with it back to the fields. Nitrogen also is returned to the soil more largely than phosphoric acid, and frequently is secured and furnished to the land by growing and plowing under crops that draw nitrogen from the air, like clovers or others of the Leguminosæ.

FIG. 1. COWBOYS AT SUPPER.

Wherever grain-growing is the chief dependence of the farm, and the crops fail to reach the former yields, we would naturally suspect that the decrease in yield is caused principally by the deficiency of available phosphoric acid in the soil, and that we may be enabled to secure the former large yields simply by applications of that missing plant food without any other addition.

Complete manures are said to be safe manures; and certainly they are where we know nothing of the state of fertility and particular needs of the soil, its previous treatment, nor of any other points that may serve as indications. But in the cases cited we have good reason to suppose that phosphoric acid is the only plant food that will be needed. If we apply two hundred pounds per acre of a complete fertilizer, analyzing two to three per cent nitrogen, eight to ten per cent phosphoric acid, and three to four per cent potash, costing thirty-five dollars per ton, we put upon that acre from sixteen to twenty pounds of phosphoric acid, and, as this is the only part of the application from which we expect to get any immediate benefit, we pay the full price of three dollars and a half for it, or at the rate of seventeen to twenty-two cents per pound. This is pretty high for phosphoric acid, especially when we consider that not the whole of it is soluble.

In a case like this all the effects which we can expect from the complete fertilizer, or from the stable manure, can be had from applications of simple phosphates or plain superphosphates, at a cost of from two to eight cents a pound for the actual phosphoric acid. If we deem it necessary or advisable to apply it in immediately available form, we might, for instance, use dissolved bone-black, which contains about sixteen or seventeen per cent of phosphoric acid, most of it soluble, and costs about twenty-five dollars per ton. A two-hundred-pound application would furnish to the crop or soil thirty-two to thirty-four pounds of phosphoric acid, at a cost of about seven or eight cents per pound of acid. This is almost twice the amount of the deficient plant food applied in the two hundred pounds of complete fertilizer, at even considerably higher cost. In dissolved South Carolina rock we might perhaps procure phosphoric acid still cheaper than in dis-

solved bone black, and in but very little, if any, less available form. Bone dust is another source of plant food that might be used advantageously in this emergency. The three or four per cent of nitrogen will do no hurt, while the phosphoric acid, although not strictly soluble, is, however, in such shape that cereals, during their comparatively long season of growth, can well get hold of the larger portion of it the first season. It contains about twenty-five per cent of phosphoric acid; and an application of two hundred pounds per acre, costing about three dollars, would give fifty pounds of the needed phosphoric acid. This is about six cents per pound, with the nitrogen thrown in gratis.

In "phosphate meal" (heretofore imported from Europe, and also offered under the names of "Thomas slag," "basic slag," and "Peine-Thomas scoria") we have another important source of phosphoric acid. It is produced in the practice of the basic process for making steel. Letters patent have recently been granted to a citizen of Philadelphia (Jacob Reese) on the basic process, and he has forbidden the further importation of phosphate meal. The Pottstown Iron Company are the only authorized manufacturers here, and now have a manufacturing capacity of two thousand tons per month, but intend to soon begin making it in larger quantities at Birmingham, Ala., at Milwaukee, Wis., and in the Shenandoah Valley, Va. As "phosphate meal," or "Thomas slag," it was imported and offered to the consumer at fourteen or fifteen dollars per ton in New York; the patent obtained after years of litigation enables the Pensylvania manufacturers to charge us $22.50 per ton for their "odorless phosphate," as they have decided to call it. Official analysis shows 21.37 per cent phosphoric acid, and while little of this, strictly speaking, is soluble in water, yet all the authorities seem to agree that it is readily acted upon by the soil water, under the influence of carbonic acid and of the other organic acids produced in the soil from decomposing vegetable matter; so readily, indeed, that most of this phosphoric acid becomes available the first season, especially for crops requiring a long period of development. A dressing of two hundred pounds of this odorless phosphate would supply 42.74 pounds at a cost of $2.25, or about five and one-fourth cents per pound. The German farmers are now using 400,000 tons of this material annually, and there can be little doubt about its becoming one of the most important sources of phosphoric acid, especially after it is manufactured in Wisconsin and other places remote from the seashore. The Western farmer should keep his eyes on this material, as it may prove of great value to him, if the monopolists do not advance the price still farther.

EVEN UP THEIR CHANCES.

DR. BYRON D. HALSTED.

It is safe to say that there are many reasons why plants are sickly and fail to give profitable returns for the labor put upon them, and the other expenses their culture has incurred. In short, it is difficult to assign the failure to any one particular cause to the exclusion of all others. Among a hundred plants, whether stalks of corn, apple trees, or cabbage plants, there will be some that are less vigorous than others. It may be that one will remain dwarfed and turn yellow while the other ninety and nine become green, vigorous and fruitful. It is possible that the trouble with the sickly plant was, as is said, constitutional, that is, it was weak to start with. In other words, it did not inherit an average amount of vitality. The seed was poor, and not making a good growth in germination it was never able to become like its neighbors, which grew well from the start. There are many reasons even in the seed why there should be a difference. In one case the seed was only half made, that is, poorly supplied with nourishment by the mother plant. This might have arisen from there being too many seeds for all to be well supplied, or due to a tendency in some plants to store their substance in other parts, to the neglect of the seeds. Many of the best fruits, as apples, etc., contain but few seeds. This is such a matter of common observation that some authors have recently advanced the idea that the fewness of seeds is a measure of the quality of the fruit. In other words, the higher the fruit is bred for quality of flesh, the less will be the activity in the productive organs. Be this as it may, there are many cultivated fruits entirely without seeds.

Another way in which seeds may be weak is from their removal from the mother plant before they have become mature. In almost any sample of seed there will be a great variation in the ripeness, and this naturally comes from the fact that upon almost any plant some seeds mature before others, and the harvesting needs to be planned for the greatest number. It would not be practicable to harvest each particular seed when it is in the best condition. Therefore, when a handful of seed is sown, as of clover or turnip, there needs to be made an allowance for the weak ones by birth and those that lack in vitality because immature.

But there is still another cause for weak plants that can be traced back to the seed, and is worthy of mention here. The seed might have been fully matured and highly charged with vitality, but owing to a long period of time elapsing between the ripening and the sowing, the germ of life has either become greatly impaired or entirely extinct. Some kinds of seeds are much better able to bear the strain of the long suspension than others, but all will die after a sufficient time has elapsed. As a rule, therefore, old seed is not so good as new, and with some sorts it is essential that it be not over one year old. Much of the failure of crops, especially in the garden, can be traced back to the seed, which was too old when it was planted or sown.

But let us suppose that the seed is in good condition—and there are many more reasons for its not being so than have been mentioned above—it remains to be seen why there are still many causes for a failure, any one of which will produce a sickly plant. At this point the reader can not but be reminded of the parable of the sower and the good and sufficient reasons therein given for a failure to obtain an increase. All seeds do not have an equal chance, even in the best prepared seed bed. The modern grain drill, with its tubes depositing the seeds at the bottom of channels of uniform depth, has done much to equalize matters; but even now some seeds are left in fine mellow ground, while others are dropped by the side of a clod which prevents it from being properly covered and in contact with the soil particles. It is easy to see that while two seeds may be equal in their vitality and accumulated nourishment, the chances are that they will not secure the conditions in the soil for germination that are alike in all respects. This seems like a small matter, but it is frequently enough to decide the whole future history of the plant.

There is one thing that many are apt to overlook because it goes on quietly and is out of sight, except to the eye that has a great deal of thinking done for it not far away. The reference now is to that struggle for supremacy that attends the growth of every spear of grass or grain in an ordinary meadow or grain field, and especially if the spears at the start are numerous, or as it is termed, the seeding has been thick. It is a common saying in all conditions of life that "the weakest go to the wall," and nowhere is it more true than in a field of thickly-set plants, whether it be a forest, meadow, grain field or a neglected weedy garden. Now, by applying this point to our two seeds, it is not difficult to see that the one that is so situated that it can germinate at the first opportunity and get a good root hold of the soil will soon secure a great advantage over the one having to lie dormant for a long time and then start into a feeble growth because the clod or stone, or both, prevent the moisture from getting to the seed. Aside from the difference in the mechanical condition of the soil, there may be an uneven distribution of the food elements that may tend to favor the one already ahead, or upon the other hand serve to bring them more nearly upon the same plane in the struggle for life.

The one or more of a score of things that may come to modify the development of the plant after it has made its initial growth, can be only hinted at here. Excess of moisture may half drown the plant; the sun may scorch it in midsummer; insects may devour its foliage, or sting its fruit; smuts, mildews, rusts, or other forms of fungi may prey upon it, or after it has escaped all these enemies it may be stricken down by frost at last. The life of any plant, and especially of a cultivated plant, is a constant struggle, but we must remember that in this it does not differ from other forms of life. Give them as even a chance as possible.

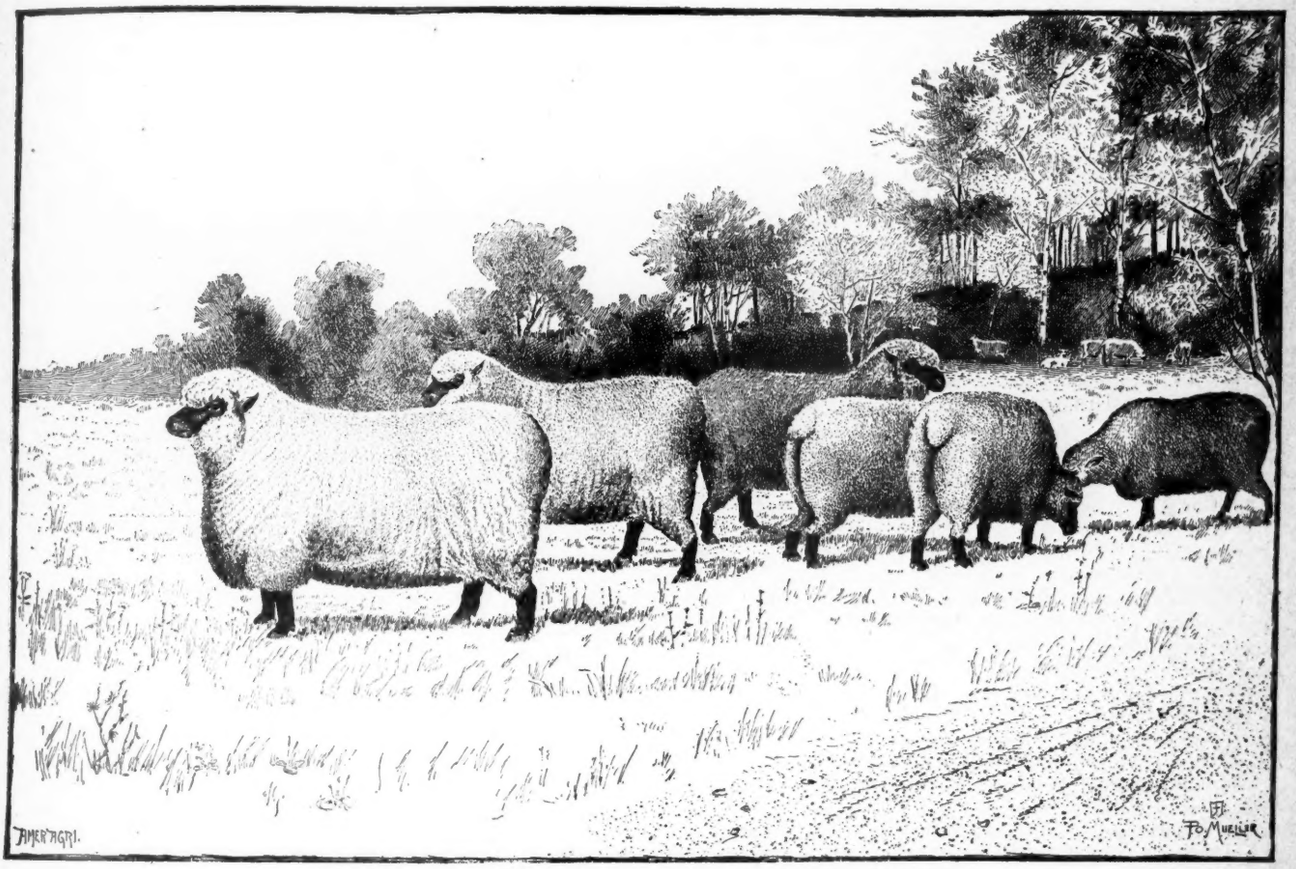
What Do You Keep Poultry For?—Some farmers ignore profits in keeping hens. They want simply enough to supply their table with eggs and broilers. Others aim for profit as well. Market poultry is the foundation of the poultry business, as pork is the foundation of fancy breeds of hogs. Like any other business, it requires knowledge and experience. One who is without experience should try a small number, learn to care for them and study the wants and characteristics of each fowl. He will then be able to increase his flock. Pleasure is a secondary aim if the aim is to make a business of poultry keeping. Every farmer should keep a few fowls; they can be cared for with little attention, when a large flock always means work to the owner.

SHROPSHIRE SHEEP.

The interest in the so-called "mutton breeds" of sheep has been steadily increasing in this country for several years, until the best qualities of lambs and sheep sell in the markets for much larger prices than beeves. This revival of interest in the English breeds of sheep has doubtless been largely stimulated by the fluctuations in the wool markets. Above all is the conviction that sheep can not be profitably kept on high-priced land for wool alone. Among other mutton breeds the Shropshires have had a full share of attention. The rapid increase and wide distribution of Shropshires may be gathered from an examination of the Shropshire Flock Book, of which the fifth volume was issued the present year. The entry numbers run from 7,214 to 13,497—a total registry of 6,285 animals. These have nearly 1,200 owners, scattered through twenty-two States, from Maine to Oregon, and New Mexico, and also four of the British Provinces, from New Brunswick to Manitoba. The American Shropshire Registry Association has 385 members in the United States and Canada. The principal officers are: President, S. H. Todd, Wakeman, Ohio; First Vice-President, Hon. John Dryden, Brooklin, Ontario, Canada; Secretary-Treasurer, Mortimer Levering, LaFayette, Indiana; Executive committee, John L. Thompson, Arcana, Ind., Wm. H. Beattie, Wilton Grove, Ontario, Prof. W. C. Latta, LaFayette, Ind., W. J. Garlack, Howell, Mich., J. F. Rundel, Birmingham, Mich.

The great success and popularity of Shropshires on this side of the Atlantic has naturally affected the views and enhanced the prices of English breeders. Mr. Alfred Mansell, of Shrewsbury, England, writing of Shropshires, says: "Never probably in the history of the present generation has the sheep trade been so good as during the season just concluded, as the great home demand has had considerable life put into it by the numerous foreign buyers, who have competed against them in the open market. * * * * The foreign requirements have been very large this year, and the various shipments to the United States, Canada, South America, the Cape, the Falkland Islands, the Australian Colonies, Jamaica, Germany and France, include many hundreds of rams, ewes and lambs, comprising some of the best of both sexes, at prices running up to two hundred guineas for rams, thirty-five guineas for ewes, and twenty-five guineas for lambs." The writer adds: "One noticeable feature in this year's demand is that buyers want ewes from registered flocks only, and some exposers have been heavy losers through neglect to enter their flocks in the Shropshire Flock-Book."

It is a hopeful sign when a breed of sheep which combines so many points of excellence as do the Shropshires obtains such widespread and permanent popularity in this country. The fact need not excite any feeling of jealousy or unfriendly rivalry from breeders of other good breeds. There is room and every requisite in our country for millions more of sheep, both Merino and all the improved breeds having heavier bodies and lighter fleeces. Our illustration represents a flock of typical Shropshires.



FLOCK OF PURE-BRED SHROPSHIRE SHEEP.

THE NEEDS OF AMERICAN SHEEP-RAISERS.

R. M. BELL, ILLINOIS.

The time has come when the American sheep-raisers need to better understand what they are doing and can do. They need to keep thoroughly informed upon matters which are constantly coming up affecting their industry. They need a clearer comprehension of all the facts about breeding, feeding, and management of flocks. The theories of the past need to be overhauled, since many of them are worse than worthless—they are damaging. The old methods were good in their time, but must give place to others more progressive and economical.

Wool is in politics, and has been since 1814, with all the uncertainty which characterizes political matters. So true is this that wool-growers have concluded that their prosperity depends upon national legislation, and without it all would go to ruin. While these views are held nearly unanimously by sheep-raisers in the United States, and are correct, the idea has grown upon our people that nothing else can be done for the general prosperity of the industry. Defective management of flocks, losses by dogs, parasites, diseases, and accidents must all be made good by national protection. Sometimes, in their humiliation and despair they ask: "Is not Congress going to make wool-growing pay?" They seem to believe that they have no right within themselves to raise sheep. No personal independence or effort is looked to beyond the traditional theories of eighty years ago.

At times of severest depression the few have shown more independence and genius, and attempted to get beyond the common

throng, into more diversified systems of sheep raising, and for a time found a practical relief from low prices of wool. While this was protecting the wool by a mutton carcass, it was of short duration; for as soon as wool came up to a living price the whole aim and purpose was turned in that direction again and the next depression found sheep-raisers all wool-growers. They forgot that the system which served them so well in hard times might serve equally well in good times. This doubtless applies to wool-growers in the Mississippi valley more than to the regions east of the Alleghany mountains. The methods of our people have been adapted to wool growing rather than to mutton-raising, and were altogether unsuited to low prices of mutton.

When President Cleveland, in his message of December, 1887, and the tariff discussion which ensued, placed wool as the central figure, the wool-growers of the country, apprehending the situation and possible results, became panicky and despondent. The destruction of the wool industry was threatened, and, fortunately for sheep-raisers, the price and demand for mutton directed attention to mutton sheep. The result was most fortunate, and while wool-growers were dejected, the mutton-raisers were making money out of their flocks. The agricultural States largely diversified their sheep industry, flocks were improved in the direction of mutton, special attention was given to feeding and liberal management, and such owners realized fine profits.

The impression more or less prevails, however, that all this is temporary, and, as in the past, when wool comes up in price, mutton will be relegated to the former status—subsidiary to wool. This may all be true, but it is not likely to be neglected so generally as in the past. The fashion or taste which demands mutton has become more permanently established. The American people never before have taken to sheep-meat so generally, and that too when beef was below the price of mutton.

How timely comes all this to our sheep-raisers. If it had been otherwise the sheep industry would have been prostrated. In the agricultural States of the East and in the blue grass regions of Kentucky, mutton-raising has hitherto been more profitable than wool-raising. In the corn States of the Mississippi valley wool-growing had been largely abandoned and mutton-raising was neglected. Such an impetus has been given the sheep business by mutton-raising that with improved intelligence suited to the business a grand and successful future is in prospect.

The improved management is too important to be passed by with only a word of caution. The whole subject rests upon improved feeds and feeding methods. It admits of no neglect, omissions, or even the accidents of a good or bad season. The feed must be liberal and of best quality, without regard to the natural supplies afforded in the pastures. Such a sheep husbandry is highly artificial, but it is highly profitable if well conducted. England, in its history of sheep husbandry, came to the time when wool-growing would not pay, and but for the growth of turnips and other crops, by which an even and abundant food supply was obtained, the mutton industry of England would never have existed. The same was true of continental sheep husbandry; the change from wool to mutton came later and more slowly to France, Germany and Austria, but it came for the same reasons and by the same methods. We have followed them all and can not succeed without attention to feeds and feeding methods. Fortunately for us we have less to overcome than they had; but economical feeds will soon become an important question, and must be met.

It is a pity that in this country, where sheep-raising is destined to rise to such marvelous importance, no effort has been made to educate and train shepherds. With wool-growers, trained shepherds have not been deemed so important as in European countries. As higher purposes and improved systems of sheep culture are required, the value of competent shepherds will be appreciated. Special training for business in all lines is now insisted upon. Live-stock receives more attention in our agricultural colleges, and when the importance of good shepherds is properly felt a special branch of instruction will perhaps be given to this matter. For the present the national government is only asked for political fostering. The time may come when a more practical aid may be extended by the government in the direction of schools of shepherds similar to those of France and Germany. The demand must come first, and the supply will be found.

Sugar-Beets for Hogs.—During August and September the pastures are dry, and some kind of green, succulent food is greatly relished by pigs and stock hogs. If a bed of beets is near the pasture, where they can be pulled and thrown over the fence every day, the good effect can be noticed. Where the rows are cultivated with corn plows, they should be at least three feet apart, and sown very early in the spring, so that a good start may be made before dry weather comes. Care must be exercised to keep ahead of the weeds by raking the ground frequently—before they hardly appear, in fact—or a great amount of work will be necessary to get the ground clean. All the catalogues give the names of the different sorts, and the proper quantity of seed per acre. Any that are not used in the fall can be pitted and used in early spring when they are needed. Mangels yield rather more tons to the acre, but are not as profitable for swine as the sugar-beets are. If used at all mangels must be fed sparingly and in connection with other food, or serious results may ensue.

BRINE SALTING BUTTER.

F. C. CURTIS, WISCONSIN.

Many teachers of salting butter recommend the brine salting process, which, on repeated trials, has usually failed to make the butter salt enough. Butter does not absorb salt; it is found in butter only in solution or as brine, and when undissolved it is decidedly objectionable. The quantity generally recommended by writers is one ounce of good salt to one pound of butter; which may be too much, or not enough, according to the condition of the butter when the salt is added. The question is not how much salt is used, but how much remains in the butter when the packing is completed. Observing butter makers have noticed that butter is much more salt one time than another; particularly when the brine salting process is used, although the same amount of salt was employed at each time, as butter does not absorb salt and it is difficult to understand what advantages there are in brine salting. On the other hand it has many disadvantages, for more salt is required; more time, and, as generally done by those who undertake it, the butter is not sufficiently salted, some retaining more salt than other, although the operator would be positive that the same process was followed each time. It is partially true in all forms of salting butter. The reason is that there is more or less unsalted water in the butter when the salt is added. To settle this seeming mystery, let us step into the dairy where a revolving churn is used which has no inside machinery, in which the butter is churned to granules, then washed and drained. If the cream was at the right stage to churn, no salt is needed in washing the butter, but if the cream was thickened or too acid when churned, the butter will be found to be of a mushy or albuminous texture, and the butter and buttermilk will refuse to separate without being thinned by the addition of water. If salt was added the liquid will become heavier and the butter float more readily. In other words, a more complete separation will take place. There is another very peculiar feature: when the butter is washed and drained until it drips, there will remain in it much more water at one time than at another, although the operator will insist that the same process has been followed. Our scientific instructors tell us that it is allowable or right to leave in the butter twelve per cent of water when the butter is completed. This we will accept as correct. What then remains to do is to salt that twelve per cent of water sufficiently to season the butter, which is about as salt as we can make it without having undissolved salt in the butter. Let us suppose we have, say, fifteen pounds of butter, which has been churned to granules about the size of wheat grains, washed and drained without the use of salt. We can add the salt (fifteen ounces) in the churn. A few revolutions will mix the salt evenly through the butter when it should remain at rest about five minutes for the salt to dissolve. Then revolve the churn until the butter is worked into a mass or in solid lumps. It will be found that most of the superfluous brine has worked out. At one time we will find this brine to measure one quart, at another time three or four quarts, although we suppose we have followed the same process. Many insist on the ounce-to-the-pound, not knowing that half that quantity is a great plenty to remain in the butter. It matters not how much salt is put in the butter. The question is, how much salt remains in it, for in this process of salting more than half of the salt comes out in the superfluous brine. The best way is, therefore, to salt the butter in the churn and there is little danger of getting in too much, provided no more is used than will dissolve. The butter may be packed in the tub directly from the churn without other working than solid packing with the common butter ladle. These views are not offered for creameries who sift on the salt when the butter is comparatively dry, but to those who have so much contradictory advice offered that the subject becomes mystified.

FARM-COTTAGE COSTING $3,000.

The elevations and floor-plans herewith represent a design of a country cottage of small area, by David W. King, architect, New York. There is a cellar six feet eight inches in the clear, with a concrete floor three inches thick. The foundation walls are of stone laid in cement mortar. It is entered by outside steps, and also a stairway connecting with passage between hall and kitchen. The first floor contains a hall and front staircase, back stairway, parlor, dining-room, kitchen, pantry, and store-room. The second story contains two large chambers, one small bedroom, bathroom, and closets. There are two rooms in the attic. An octagonal bay-window in the dining-room, and a broad veranda with steps and

FIG. 1. FRONT ELEVATION.

FIG. 2. SIDE ELEVATION.

railings. The bay-window at the end of the dining-room is carried up two stories in height. The frame is of spruce; the sills being four by eight inches, studding two by four inches, and sixteen inches from centers; floor-beams two by ten inches, in first and second stories, and two by nine in attic, all sixteen inches from centers; main rafters, three by seven inches; veranda rafters, two by seven inches—all twenty inches from centers; valley and hip rafters, two by ten inches. The veranda floor-beams are three by eight inches; plates, four by eight inches; posts, six by six inches, chamfered. The barge-boards of the main roof are of three by nine inch white pine, dressed. The side walls and gables are sheathed with surfaced spruce, covered with narrow white pine

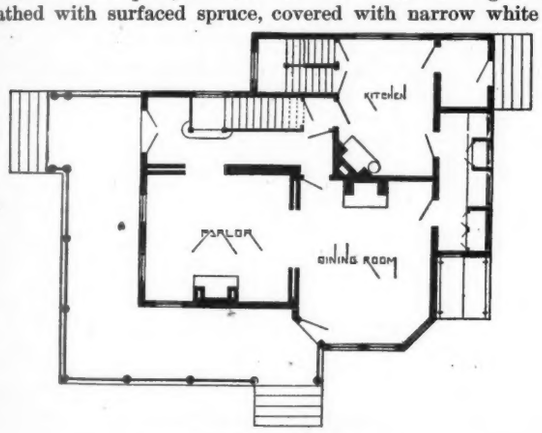


FIG. 3. FIRST FLOOR PLAN.

beveled siding, in first and second stories, and shingled in the gables. The roof is covered with white pine xxx shingles nailed to one by three-inch shingle-lath. The belt courses, mouldings, door- and window-frames, casings, and jambs, are of dry white pine to show clear face; the attic floor is of tongued and grooved merchantable white pine, blind-nailed to each beam. All other floors are of one by three-inch yellow pine, tongued and grooved, mill-worked, blind-nailed. The inside wood-work is of white-wood with the exception of the stairs, which have yellow pine tread and risers, oak newels, rails, and balusters. The wood-work is of the same, left natural color and filled, varnished, and rubbed smooth. All other wood-work of the first story is stained; that of the second story and attic painted two coats. The window-sashes are of white pine, glazed with double American glass, and balanced with cast-iron weights and brown hempen cord. The hardware for the first story is of bronze; second story, bronzed iron with suitable knobs, brass-faced mortice locks, etc. The bath-tub is of planished copper; water-closet Derwent pattern washout closet, wash-bowl of white porcelain, with marble top, properly supplied with cold water from tank or water supply; hot water from boiler in kitchen. There is a boiler of galvanized iron to hold forty gallons; a portable range; a galvanized iron sink; all with proper waste- and vent-pipes, the wastes deposited in a cess-pool forty feet from the house. The chimneys are of hard brick laid in lime and cement mortar, with openings for fireplaces and range. Ceilings and walls are hard finished on two coats of brown mortar and well-seasoned lath. Outside blinds are supplied to all the windows, and the whole is painted two coats. The above house was built for $3,000. Fig. 1 shows the front elevation; Fig. 2 the second floor elevation; Fig. 3 the first floor plan, and Fig. 4 the second floor plan.

Size is not Everything.—There was a time, in the early history of our country, when size was everything. We knew we had a big

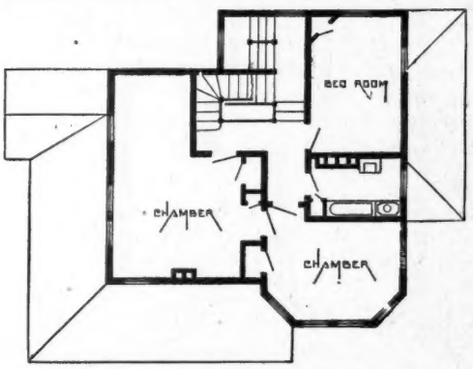


FIG. 4. SECOND FLOOR PLAN.

country to subdue, and every one desired to make the most of his opportunities by owning, if not "the earth," at least no small part of it. With the idea that the ruling order of things in the sea is the destruction of the little fish by the big ones, many have attempted to demonstrate the same law upon dry land. Farms of the size of counties have no merit in them, and gradually such become broken up of their own weight, and the owners, if they live through the struggle, finish their days among their neighbors as those who were once foolish enough to own vastly more than they could control. However the tendency may be toward smaller

farms, they are still too large, at least in many cases, for the men who own them. If a farmer is land-poor his land is apt to get poor also, and the more poor land poorly tilled a man owns the poorer he grows. Let us appreciate more fully the importance of clean and high culture with a certain amount of capital—and capital means money, brains, etc. The rule should be to take only as many acres as can be kept in the most perfect condition. Because one hen raises fifteen chicks to chicken-hood, it does not follow that a thousand hens kept by the same person will do each and all an equally great thing. But, leaving the hens out of the question, do not place all the eggs in one basket. We do not judge the merit of a picture by the square feet it covers. If there is a "motive" or "theme" in the painter's mind, his genius will show itself on a picture card. A small farm may be a work of art and profitable, while a neighbor land-owner breeds mostly weeds and contempt.

THE POTATO BLIGHT.

PROF. CLARENCE M. WEED, OHIO AGRICULTURAL EXPERIMENT STATION.

The disease commonly known as potato blight, potato rot, or potato cholera, is caused by one or more species of the minute parasitic plants known as fungi. As a rule American writers have assumed that the species concerned is the same that has been present in Europe for many years—*Phytophthora infestans.* While there is no doubt that this is often the cause, there is also good reason for believing that other species of fungi are sometimes responsible for the blighting of the leaves, and consequent injury to the crop. When attacked by *Phytophthora infestans* the potato tops blight, the tubers rot; and the leaves are covered with a fine, whitish mildew. But in many of the Western States the blight often appears without the mildew on the leaves, or the rotting of the tubers.

Whatever precise species may be found to cause the diseased condition, it is well settled that it is of fungous origin; and that the fungi are chiefly propagated by spores—infinitesimal bodies corresponding in function to the seeds of higher plants. When these spores fall upon the leaves of the potato they germinate and enter the leaf tissues where the mycelium—a growth analagous to the roots of the higher plants—develops at the expense of the leaf to such an extent that the latter is destroyed. Experiments made last year in New Jersey by Col. A. W. Pearson, and in Ohio by the writer, indicate that this disease may be prevented by the use of Bordeaux mixture. Col. Pearson planted several plats of late potatoes, and sprayed all but one of them. The treated plats were little or not at all affected, while the untreated one was destroyed. In the Ohio experiments fifteen feet of the ends of a large number of rows were treated, and at the time of harvesting it was found that the treated vines had suffered very much less injury than those not treated, the increased yield of the former being at the rate of sixty-four bushels to the acre.

The standard formula for the Bordeaux mixture is as follows:

"Dissolve six pounds sulphate of copper in sixteen gallons of water; in another vessel slake four pounds fresh lime in six gallons of water. When the lime mixture has cooled to the temperature of the air, pour it slowly into the copper solution, mixing the fluids thoroughly by constant stirring."

In our Ohio experiments we diluted this solution about one-half, using six pounds copper sulphate and four pounds lime to fifty gallons water instead of twenty-two gallons, as ordinarily recommended. We usually made it by filling our Nixon barrel machine, which holds fifty gallons, nearly full of water, and then adding three or four gallons hot water in which the six pounds of copper sulphate crystals had been dissolved. The freshly slaked lime was then poured in, and after a thorough stirring, the mixture was ready for use. Sometimes instead of the crystals we used *powdered* copper sulphate, in which case it was not necessary to heat water to dissolve it, the powder being simply put in the barrel of clear water and was soon dissolved. When we wished to add London purple, we simply put it in either before or after the mixture was made. I am not sure whether this dilution of the formula is advisable or not, as Professor Scribner has found in his grape-rot experiments that the best results were obtained from the standard formula given above.

The first application was made May 28, the vines being then about one-third grown. We sprayed the upper and lower surfaces of the leaves thoroughly, and to kill the potato beetle added London purple to the mixture, putting in one ounce of the poison to ten gallons of the mixture. It cleared the potato beetles off completely. A second application was made June 6, when the vines were much larger than before. The first indications of blight were noticed about June 20, and during the next week the sprayed vines showed some evidence of the disease. The Bordeaux mixture was again applied June 29. Early in July the disease had seriously injured nearly all the vines in the field, except those sprayed, which were greener than the rest, though even they showed considerable damage. The weather during much of the first part of that month was warm and moist, being very favorable to the development of the disease. The frequent rains washed a good deal of the Bordeaux mixture off, so that it was again applied, and for the last time July 16.

It is probable that the ammoniacal solution of carbonate of copper will also prove of value as a preventive of this disease, though it has one disadvantage in that we can not add the arsenites to it, because the ammonia renders them soluble, and thus endangers the foliage. The formula for this fungicide is as follows:

Carbonate of copper	3 ounces.
Commercial ammonia (22°)	1 quart.
Water	22 gallons.

Add the ammonia to the carbonate, and when dissolved dilute to twenty-two gallons with water, forming a clear solution. No doubt many experiments will be made this season at the experiment stations and by private parties, and probably by another year we shall know definitely whether this dread disease can be prevented in a practical way in general field culture.

HOME CONSUMPTION OF CHEESE.

GEORGE E. NEWELL, NEW YORK.

As a practical cheese manufacturer, the writer proposes to advance a few ideas relative to the care of the product. Family marketers are not all supposed to be expert judges of cheese. They should pick one out with a good rind, yielding, yet firm and elastic. The rind is an excellent indicator of quality. A soft surface denotes a poor flabby interior. Cheeses are cured in a temperature of from 65° to 70°. They do not, however, require this degree of warmth, after they are forty days old. A cooler atmosphere is better for them then. Take the cheese from the box, and rub off all mold that may have accumulated since it left the factory. Cover it with a screen, and put it in a cool, dark place. If no regular cheese screen is at hand, make a light frame-work and cover with mosquito netting. Something of this kind is necessary to exclude insects, and yet permit access of air. This should be cool and dry. If the cellar is the least damp, do not risk the cheese in such a place. Get a full cream article of fall production, because autumn milk is far richer, and if anything purer, than that yielded earlier in the season. It does not take on that sharp, pungent flavor, so characteristic of old cheese. To the palates of some, this biting sensation of strong cheese is agreeable, but the majority of people prefer a milder flavor. Have the seller furnish a sample, and choose one possessed of a rich, nutty flavor, buttery, and compact of texture. Keep it under the conditions described, and cut from it fresh for every meal. Good cheese can be ruined by drying, when too much is cut at once. This is one objection to buying it in small quantities at the grocery. The English complain that American cheese dries up and chaps quicker on the cut surface then their home-produced stock. This difference grows out of the diversity of climate. Do not attempt making cheese at home, unless you have all conveniences for it, or are isolated from dairy districts. With the amateur, fine cheese is not so easily made as fine butter, and the housewife who is partially ignorant of the fine details of managing coagulated milk will invariably produce an article greatly inferior to factory make. The problem has been puzzling many heads how to increase the consumption of cheese. The only way is to teach the people to buy it of the factories, or through their agents, and in quantities, as they would flour by the barrel, or butter by the package. We have been so engrossed with our foreign cheese trade, catering to foreign tastes and demands, that the needs of the home trade have been greatly neglected, and much expert work will have to be accomplished before a more general demand is made for the product. If grocerymen would purchase direct of manufacturers, they could afford to resell to consumers for two or three cents per pound cheaper than if they purchased of middlemen. Some such course as this would greatly increase cheese consumption in this country.

A Question About Raising Cream.—The question has been asked, Why will not the cream rise in deep pails as well, when kept in the air at a temperature of 45°, as in water at the same temperature? That it will not so rise is a matter of fact which surprises some persons. The explanation is simple. When a pail of milk is set in cold water it is cooled very rapidly and in a short time the milk will all

be reduced to the low temperature of the water. The change of density of the milk, produced by the cold, causes the lighter cream, or the butter globules, speaking more correctly, to separate and rise to the surface very quickly. If the milk be set in the air at the same low temperature, it will cool very slowly, because air is a very slow conductor of heat, and water a very quick one. Consequently the upward motion of the cream is so slow and weak that it can not force its way through the depth of milk before a change occurs in the milk by which the motion of the cream is stopped. Rapid cooling is necessary for the rapid rising of the cream.

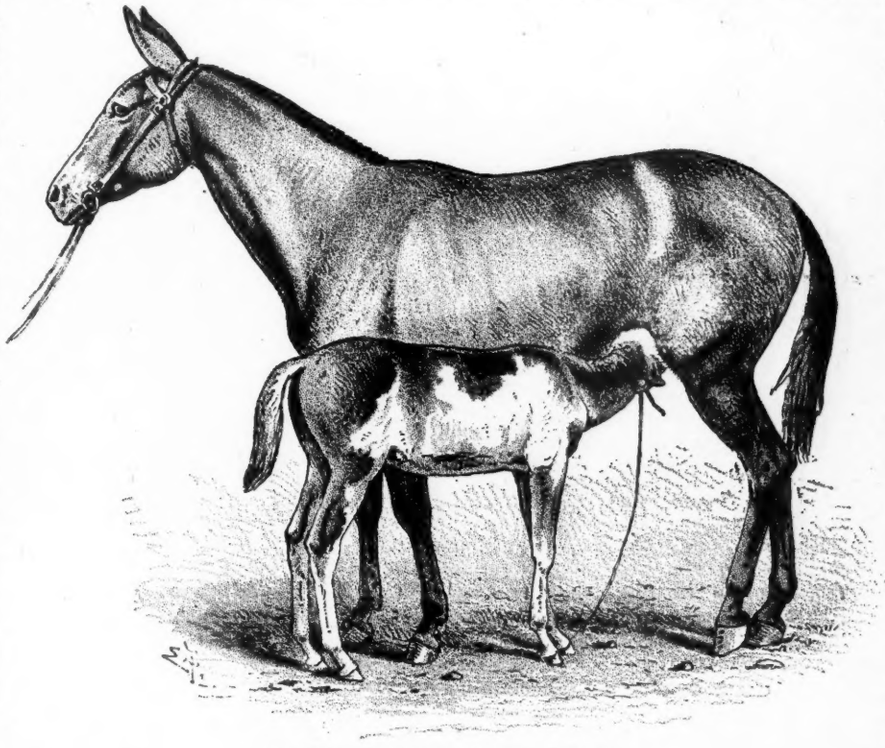
HARNESS CLOSETS.

E. N. GEORGE.

The regulation horse-stable generally contains a parallel row of stalls, back of which is a partition or outer wall, to which are attached pegs for harnesses, halters, blankets, etc. A little shelf above may hold curry-combs, brushes, and a few bottles of lotion. The harnesses frequently drop to the floor, and are trampled on by the horses, or even if they are securely fastened to the pegs, the leather catches all the flying dirt, which gives them a dingy appearance. They are also exposed to the corrosive ammoniacal gases. Why not keep them suspended in tight closets, as we do our wearing apparel? Such closets can be made to utilize space which would otherwise be unoccupied, and not in the least interfere with the convenience of the stable. There are at least two vacant corners in nearly every stable, in which the closets may be placed. Measure from the corner each way on the wall about five feet. At each terminal point strike a plumb-line from ceiling to floor, marking it plainly so that boards can be accurately matched to it. Tack to the floor a square-edged cleat, running from the line on one wall to that on the other. Measure the desired width of a door in the center of the cleat, and set in two light uprights, reaching from the floor to the ceiling. The uprights should be firmly toe-nailed to the floor and ceiling, using matched lumber. Saw it in lengths to reach from door-casing to outside corners, sawing the farther ends beveling to fit neatly against the stable-wall. Above the door full-length boards can continue to the ceiling, and, with a door hung, the closet is nearly complete. All that remains is to fasten the pegs or wooden hooks to the wall inside, whereon are to be hung the harnesses. The whole is a simple job, which any farmer with a saw and hammer can do in half a day.

A MATERNAL MULE.

A distinguished man once remarked that a mule has no pride of ancestry nor hope of posterity. When nature has produced a mule she generally stops there and the series ends, as with other hybrids. There are, however, a few cases on record of productive mare mules, but they are so rare as to be justly regarded as freaks of nature. One of these freaks is illustrated herewith. The mare mule is owned on the ranch of Mr. Timothy Dyer, Wyoming. The sire is a gray stallion, also owned by Mr. Dyer. The colt is piebald brown and white. On the haunches it shows the short hair and dark brown hide of its dam. Two other authenticated cases are reported of mare mules producing foals, both of which were exhibited for a long time in the Jardin des Plantes, Paris. The owner of the freak illustrated herewith has been offered a large price for the dam and foal, which he has refused, as he prefers to raise the colt.



MARE MULE AND COLT.

PROTECTION AGAINST SOME FARM PESTS.

An excellent authority advises perseverance in the use of a remedy one selects to rid himself of any variety of pests. This undoubtedly is true in most cases; but if every method chosen were as successful as that employed by a New York gentleman in a crusade against rats, there would be little need of its frequent repetition. Having some knowledge of chemistry, he opened the floor in several places in the upper stories of his house, and set therein vessels containing sulphuric acid, black oxide of manganese and common salt, and afterward closed down the boards. The result was a slow chemical decomposition and recombining of elements, in the progress of which the heavy, stifling gas chlorine was disengaged. This penetrated all the open spaces down to the cellar. A few breaths of the poisonous atmosphere served to convince the rats that danger was brewing. Seizing a portion of whatever plunder was at hand, every rat rushed from the premises, sneezing and weeping copiously from having inhaled the noxious chlorine. It was months before a single one ventured to return. The acrid chlorine also penetrates the room, rendering it nearly untenable for a few days. Powdered potash scattered about the haunts of rats and mice, and rubbed on the edges of their holes, makes their feet sore, and often drives them away. It is also a good plan to sprinkle potash on cotton batting and stuff it into holes and crevices which they frequent. Another excellent remedy, that the writer has tested, is to stir strychnine with Indian meal and add either grated cheese or the oil of anise. Sir Humphrey Davy's great destroyer for rats was hog's lard and carbonate of baryta, mixed well together and smeared upon the inside of a skillet, which he placed well out of the reach of any other animals than these mischievous little rodents.

Western farmers have formidable enemies in two varieties of the spermophiles, and in the gopher, which is hardly less abundant. Many a wheat field, promising an abundant yield, has been so ravaged by ground squirrels as not to be worth the harvesting. The favorite means employed for their destruction are poisons such as strychnine and phosphorus. A drachm of the former is dissolved in a quart of whisky, and the solution poured over dry wheat in such quantity that the surface of the liquid is on a level with the top of the grain. In twelve hours the wheat will have absorbed all the liquor, and a few grains are thrown in front of every squirrel hole. Two kernels are sufficient to kill a squirrel. Not only this, but if a cat breakfasts on the squirrel, it, too, is doomed; and woe betide the vulture or raven that feasts off the cat's carcass or even makes a tidbit of its eyes! The average farmer boy, however, will invariably prefer the "smoking out" process of killing squirrels. It has a barbaric flavor which is eminently suggestive of strategy and unconditional massacre. A rag is wet with kerosene, sprinkled with sulphur, set on fire and crowded into the nearest hole, which

is then carefully filled in with dirt. Often the smoke issues from numerous surrounding holes. These are immediately covered like the first. Thus dozens of squirrels have been known to be smothered by the burning of a single prepared rag. An ingenious experimenter invented a bellows with a chamber for burning sulphur which can be utilized for blowing poisonous fumes into the holes. A mixture of phosphorus, molasses, flour, and wheat is one of the commonest preparations employed to destroy spermophiles and gophers. The latter are often caught in traps which are regularly set in various parts of the field or orchard.

Rabbits, though far less prolific than gophers, are not less injurious to the garden and orchard. Trunks of trees can be preserved from their gnawing by binding strips of cloth, tarred paper, or even newspapers around them as high up as a rabbit can reach. A still easier way to protect an orchard is to daub the trees with grease, scented with some disagreeable odor. Nothing short of a close fence of wire or pickets will prevent Master Bunny from making depredations on a garden of cauliflower and pea-vines. In a single night, the fresh green pods on long rows of vines will be all opened and robbed by these neat little workers. Under such circumstances, the barking of a good watch dog will often keep these timid animals at a discreet distance.

Speaking of dogs, one certainly is not justified in classing them as pests, and yet, a dog that will suck eggs, particularly if he be otherwise valuable, is one of the most aggravating of trials. A farmer had a dog which he declared was worth all of a hundred dollars to him for catching gophers and rabbits, but, unfortunately, he showed an equal fondness for new-laid eggs. In fact, he would spring up wildly from the softest bed at the cackle of an overjoyed biddy. This dog was finally cured of his expensive habit by showing him a hot boiled egg before his jaws were forcibly opened and shut upon it. Of course, he howlingly ejected the blistering mass and from that time on would run at the sight of an egg.

TEST YOUR COWS.

J. N. MUNCEY, IOWA.

My neighbor, who is one of the most successful dairymen in this section, became convinced, by the average per cent of butter he was obtaining from his herd of cows, that he should proceed immediately to sell the inferior cows. He asked me to make a chemical analysis for butter-fat from the milk of each cow. I did so. The following table gives the age, approximate quantity of milk per day, and time giving milk since last calf;

No.	*Per Ct. Butter-Fat.*	*Lbs. Milk Pr Day*	*M'nths Since Last Calf.*	*Age.*	*No.*	*Per Ct. Butter-Fat.*	*Lbs. Milk Pr Day*	*M'nths Since Last Calf.*	*Age.*
1	3.0	24	2	3	8	2.9	16	8	3
2	2.9	24	2	3	9	3.1	28	2	6
3	3.4	18	1	2	10	3.4	12	8	5
4	3.8	10	10	3	11	4.0	24	8	6
5	3.1	20	8	5	13	3.8	24	6	7
6	4.0	10	8	3	14	3.2	10	4	3
7	3.0	12	8	5	15	4.0	24	8	4

He proposed to retain in his dairy Nos. 4, 6, 11, 13, and 15. His first decision was based on analysis only. But I suggested that he take into consideration all other facts about each cow. For example, No. 5 is giving sixty-two one-hundredths pound butter-fat eight months after calving, while No. 6 is giving only forty one-hundredths pound butter-fat. I think No. 5 is the better cow. Of course, No. 6, when two years older, may be expected to give more milk the same time after calving, but probably not double the amount she now gives.

It should be understood that the analysis and churn are not always comparable. Generally, however, add about one-tenth to the analysis, to make it agree with the churn. For example, No. 15 would probably give four pounds plus six and one-tenth of four, or four and four-tenths pounds butter per one hundred of milk.

It would not always be advisable to sell cows because the per cent of butter is low. Persistency as a milker, quantity of butter and milk per week, age, and disposition, are all important in deciding whether to sell or not.

Large Yields of Potatoes depend, among other things, upon the number of hills on the acre, and the yield per hill. If the hills averaged only three pounds each, an acre containing only 10,000 hills would yield 500 bushels. This is not a large yield per hill, nor a great number of hills per acre. Several contestants got from 15,000 to 25,000 hills on an acre, and Mr. Rose squeezed in 38,000 hills, and an average of but a fraction over three pounds per hill would have given 2,000 bushels per acre. But how much easier it is to figure this out than to grow the crops, last year's experience has demonstrated. But this point shows the necessity of a full stand—of supplying all missing hills, if large crops are desired. This fact is not half appreciated. Very few hoed crops have as full a stand as they should. On an acre of potatoes planted three feet by one foot in the row—the usual way—making 14,520 hills per acre, we have counted no less than 4,500 missing hills. At three pounds to a hill, this might mean a loss of 225 bushels—an amount of itself a fair crop. Aside from sets with dormant eyes, so many misses are too often due to careless planting—covering too lightly, or so near the surface as to be washed out, or covered so unevenly that some plants get a great start of others.

OATS FOR CALVES.

DR. A. S. HEATH.

The most troublesome period with young calves is that between the weaning from the cow and the time when milk is entirely withdrawn. It has been often asked: "Shall we let the calf suck? How long?" We conclude, from ample experience, that the calf, if well and strong, most quickly, thoroughly, and constantly clears the udder of milk, which if partially removed, by slovenly and imperfect milking, produces caking of the udder. Young calves will early eat fine hay, and next begin to eat a tablespoonful of dry oats. The milk should be given night and morning only, and at noon a few dry oats. To induce the calf to eat them, they may, at first, be very slightly moistened with milk. The oats should not be put in the milk, for they either choke the calf, or pass to the fourth stomach unmasticated, where they will not digest. Give the oats on an empty stomach. When the calf is hungry, it readily begins to chew them. By thus sparingly feeding calves, the mastication, maceration, and digestion, through all the functions of the four stomachs, are gradually and naturally established, thus keeping the calf healthy, strong, and growing. The delicate calf is often made sick by exposure to rain, cold, or burning sun. Calves, like pigs, grow quickly into money. Theory, when amply verified by long and intelligent experience, always proves a valuable guide in the avocations of life; and no class of men can more readily understand this fact, for no class of thinkers and workers has so many practical arts to practice in his multiform vocations as the farmer. The agriculturist is a farming philosopher, for theory and practice can not be judiciously divorced. A majority, directly or indirectly, of all the honest toilers of the world, are engaged in agricultural pursuits. It is to this fact that the best agricultural journals have the largest circulation, and especially the largest perusal.

Oats contain—most perfectly balanced—the elements of the tissues of young animals. In conjunction with and after milk-feeding, oats promote the healthy growth to a greater extent than any other food or fodder. Even on rich June pasture, calves do better by an additional small feed of oats. Breeders (intelligent breeders) of young colts feed oats liberally, to the best interest of their calling. The prevention of disease in young animals is far more satisfactory than the cure of disease when once fastened upon stock. In fact, preventive medicine, for both human and animal, is by far the more commendable and honorable to both practitioners.

DAIRY MUSINGS.

The fast milker has the fullest pail.

Cleanliness goes before profit in the dairy.

The man that figures closely never regrets that he began winter feeding early.

The temper of an animal has more to do with its value than has the color of its hair.

When you see clubs lying around the barn-yard, look out for cows that have a long, dry spell.

If you keep a barking dog or a yelling man in the feed lot, you must have extra large measures in the bins.

Ought there not to be a law compelling dairymen to keep their dairies clean, or else to keep their products at home?

More winter-made butter and less summer production is what is demanded by both the markets and the profit side of the dairy.

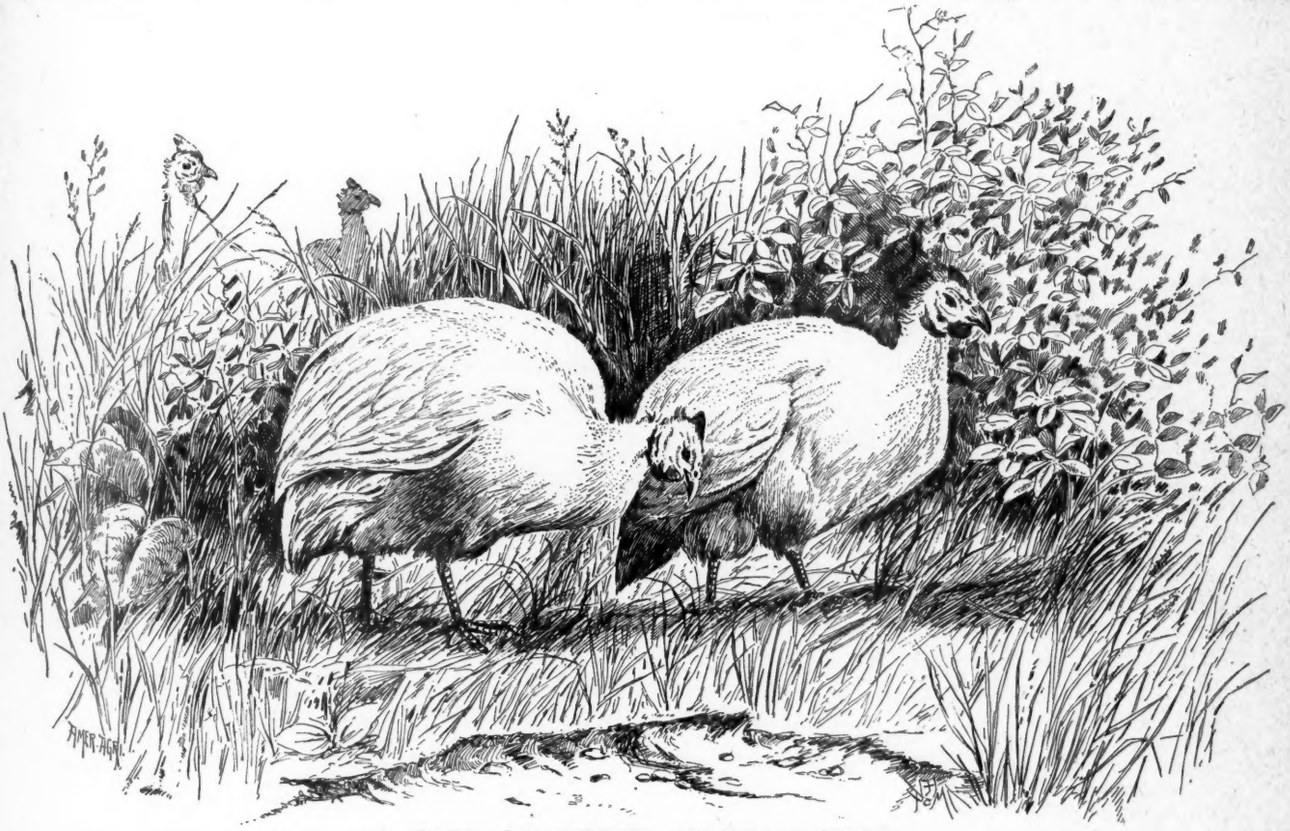
Don't talk while milking. You can't milk so fast: the cow will learn to give down her milk slowly; and the talking excites the cow.

Hooks about the stable, upon which to hang the lantern, are an excellent thing. The lantern set down is frequently knocked over, and the straw or hay set on fire.

WHITE GUINEA FOWLS.

MRS. J. B. HOWE, INDIANA.

There are two varieties of Guinea fowl, the white and the pearl. Until quite recently it was usual to see only the pearl, which were kept upon farms, mainly as curiosities, as they were wild, shy, and their flesh dark colored and indifferent in quality. Now, however, the white Guinea has almost driven its speckled cousin out of the field. It has several points of real superiority. It is not wild, but delights to associate with other poultry, laying in the nests of hens. They are monogamous by nature, preferring but one mate, and clinging to that one with great tenacity. At quite an early age they refuse to be separated from the hen that hatched them, following her about all that season and until they themselves choose mates the next season. If the chicks are sold, or are in any way permanently separated from the hen, they immediately attach themselves to a hen or rooster of the same color, and without questioning whether the attachment is mutually satisfactory or otherwise "cling closer than a brother." White Guineas are fine table fowls, possessing all the requirements in the way of yellow skin, delicate and fine-grained flesh. They do not begin laying until the weather is quite warm, but they keep it up until late, and their eggs are very welcome while common fowls are indulging in their annual molt. Guinea eggs are medium-sized, with very hard shell and of excellent flavor.



A PAIR OF WHITE GUINEA FOWLS.

Guineas are great foragers for insects, and as they do not scratch may be allowed to roam at will, and as they are unusually active and indefatigable it is impossible to estimate the number of the insect pests they will destroy. They are worth their food for this alone, as they are not large consumers of grain. They are quick to detect any invading foe, such as hawks, skunks, weasels and the like, and will also sound their peculiar note of warning—"buckwheat! buckwheat! pot-rack! pot-rack!" even if a strange cat or dog or vagrant boy appears in the precincts of the poultry domain.

It is difficult to distinguish the sexes, as the only apparent difference is that the male's head is larger, with more fully developed wattles; he is more quarrelsome and aggressive and his note is slightly different. While the female utters something similar to the cry indicated above, the male utters something like "ca, ca, ca, ca, ca, ca," uttered very rapidly, while the note of the female is uttered in a more leisurely manner. Later in the season the Guinea hens love to steal away by themselves and make a nest, and, if undisturbed, they will fill it full of eggs, sit and hatch them all. They are good mothers, taking good care for the young ones. Guineas are pretty, interesting fowls, well worthy a place in any poultry ranch or farm, and except when quite young require but little care, as they demonstrate, in a peculiar manner, the faculty of taking care of themselves.

FOOD FOR CHICKS.

E. K. WINANS, NEW JERSEY.

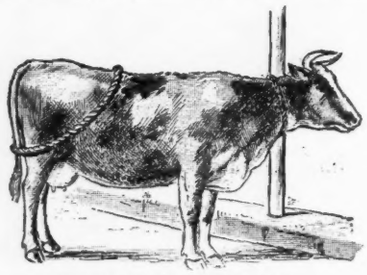
Millions of little chickens are now toddling about in front of the coops of our land. What will become of them? Most of them will die at about the age of five days for lack of right feeding. Let us try, this summer, to save some of these unconsenting martyrs to the ignorance or laziness of their owners. Granted safe coops, cleanliness, and motherly hens: nourishing food, properly fed, will do the rest. Usually the question is how to use Indian corn advantageously, because, at present, this food is the great American reliance. Corn meal ought to be well cooked before a grain of it is fed to young poultry. Raw corn, even if scalded, irritates young intestines, and it should be palatably cooked so that it will be eagerly eaten. The idea should be, not to manage with as little food as possible, but on the contrary to urge the chickens to eat all that they can profitably digest. Clean feeding trays are as important in this point of view as they are in the matter of health. Chickens hate dirt and dirty dishes. The mold on an old feeding board is a plant which will grow rapidly in their "little insides." To make a good "standby" pudding for chicken-feed, take one-half yellow corn meal, one-half middlings or bran, and a little salt. Mix soft with skim-milk and bake slowly. If the milk is sour, put in some soda. One can substitute for the milk a broth made of the table scraps. This pudding can be used as a steady diet, varied by an occasional day of oatmeal. If there is not enough meat in the table scraps, add more.

Give your chickens milk to drink always if you can; give water also or they will suffer from thirst; and beware of the tyrotoxicon which kills many babies and chickens. Sour milk soon turns to spoiled milk. Don't delude yourself by trusting that your chicks will do exactly as well when you miss a feeding time or two, provided you leave extra food by their coops. Go if you must,

leaving some food which will keep sweet, but they will not prosper as when fed at the regular hours. Little chicks often starve to death rather than eat stale, dusty food. Look out for the scrawny fledglings; every one will look out for the downy new ones.

DEVICE FOR USE IN MILKING.

To get the full supply of milk and cream, unvarying kindness and quietness in the stable is a requisite. With the best intentions in the world, a workman may be led into an angry exclamation, when receiving a vigorous switch in the face from the tail of the cow he is milking. A device to restrain the cow from moving her tail, and also to prevent voiding during the operation of milking, is herewith illustrated. A piece of old rope, at least an inch in diameter, is cut off six feet in length for cows of ordinary size. The ends are fastened neatly together by a splice, covered with twine.



MILKING MADE COMFORTABLE.

This circle of rope is placed upon the cow as shown in the illustration. There should be one for each milker, and nails placed where they may be conveniently hung when not in use.

A SWILL- AND TEMPER-SAVER.

Any one who has fed pigs, and been annoyed by their getting into the trough while it was being cleaned out, and then after they are driven away rushing back and getting their feet in the trough just in time to have the swill poured all over their heads and much of it spilt, will appreciate the contrivance represented in our illustration, engraved from a sketch furnished by Mr. Willard F. Hallock, Middlesex Co., Conn. The trough is fastened inside of the pen; two boards are hinged so as to swing in over the trough. In the middle of each board is a strip fixed to slide up and down. A heavy pin in the upper end of this strip acts as a convenient handle. This strip drops down on the outside of the bottom board of the pen and holds the whole firmly in place. When the pigs are

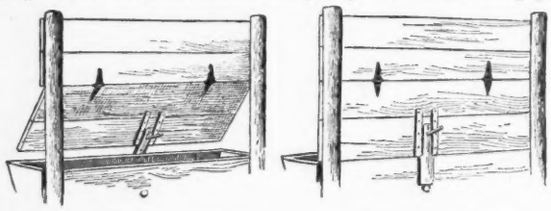


FIG. 1. TROUGH CLOSED. FIG. 2. TROUGH OPEN.

to be fed the slide is drawn up, and with the foot the hinged boards are pressed inward, the strip dropping down behind the trough, leaving the whole length of the trough clear to sweep out and pour the swill in. Mr. Pig is on the other side of the boards and must bide his time. In Fig. 1 the trough is shown as closed against the pigs; in Fig. 2, free to their access.

The Cause of Poor Radish Seed.—It is stated, upon what seems good authority, as well as good sense, that the poor quality of radish seed that comes to our market is the result of saving the seed from stocks that have not been transplanted. This story, however plausible it may appear, is in no respect true. The true state of the case is, all the radish seeds which come to our country are grown from transplanted roots. The growers would not produce them in any other way; the seeds are sown in seed-beds, quite closely, and, when fit for the table, they are transplanted into the field. They are first grown in seed-beds for economic reasons, as a given amount of seed-bed will furnish roots that will plant at least fifty times as much ground as the seed-bed contains. This enables the growers to economize time and labor. Much of the seed grown in France is raised by small farmers, who do all their farm-work by hand; so, while the plants are growing in the seed-bed, the farmer is spading the soil for the crop. Poor radish seed, like poor other seeds, comes from poor selection. A worthless plant will always yield double the amount of seed that a valuable one does.

C. L. ALLEN.

CULVERTS—HOW TO BUILD THEM.

W. E. PARTRIDGE.

Every farmer in the country knows how to build a culvert. It would be a disgrace to a farmer's boy ten years old if he could not tell just how one ought to be made, even though he lacked strength

FIG. 1.

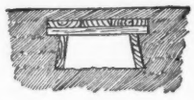


FIG. 2.

to put in the work. There is the stone culvert—that is best of all when the stone can be had. Then the log culvert, with poles or planks on top. There is the culvert of heavy planks, strong, and supposed to be durable.

The farmers of the Eastern States have been building culverts for at least one hundred years. They ought to know what they are built for, as well as how to build them. But they don't. Practice speaks louder than words. While they say that a culvert is to carry water under a road, then practice says that it is only a little bridge over a hole. Is proof wanted? Every heavy rain-storm washes out innumerable culverts—perhaps the very same that were washed out in the same way two or three years ago. And they will be washed out again in a little while. And why? Because, when they are built, no end of pains are taken with the top and sides, while the bed on which the water is to flow is left just as the man with the hoe or shovel dressed it. It's dry weather. Nobody thinks it worth while to prepare a way for the water which will come in the spring or fall. When a smart rain comes and fills the ditch, a little stream struggles along the broad, flat bottom of the culvert. It is spread out in a wide sheet. The leaves it has brought along with it are piled up here and there, and it barely trickles through. A heavier rain brings in some stones. The rough, flat water-way gets more and more obstructed each time the water finds its way under the road. "Of course," says the farmer, "culverts get stopped up." Yes, and then they are washed out bodily, and the farmer has to pay for building them over again. And perhaps he has to wait a couple of weeks until the road surveyor gets ready to see to matters. When there is a stream flowing all the time, who ever saw any one take pains to have a clear bed for it under the road? There is always space ample for the flow, but so obstructed with rocks or stones that, when the flood comes, the stream begins at once to attack the sides. Perhaps it rises and flows over the roadway. Figures 1 to 4 represent primitive forms of culverts of different degrees of defectiveness, but all of them may be found in country roads. Fig. 1 belongs to the "corduroy" period of road-making. A rough log is thrown down of either side of the

FIG. 3.

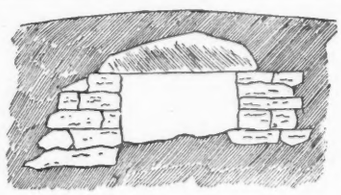


FIG. 4.

FIG. 5.

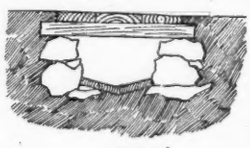


FIG. 6.

hasty excavation, and short string-pieces are placed across them, to support the planks. Fig. 2 is of similar construction, save that planks are set up edgewise in place of the logs. Fig. 3 is bad and expensive. Fig. 4 is still more costly, and equally bad in construction at the fundamental point.

Now, a lesson from the engineers who build sewers will cost nothing, and it may save some culverts next year. It is a lesson that pertains to the bottom, and not to the top of the culvert, the

water-way and not the roadway. The engineers have found that when they want a stream of variable size to keep its course clean, the best form of pipe or conduit for it is an egg-shaped section, with the small end down, as shown in Fig. 5. The tiles rest upon planks properly graded. Much drain-pipe is made of this form. Then, again, when they want water to flow anywhere, they give their pipe a down-grade in that direction. The culvert bottom is usually not only flat, but level. Water does not run fast when on level ground. Where there is a brook to take care of, make its bed smooth in the culvert, and on the up-stream side remove any loose, round, or other stones which high water might lodge under the road-bed.

If it is too costly to buy an oval pipe for the culvert, make a plank bottom. But do not lay the planks flat. It will take a broad and heavy stream to carry a single bunch of leaves through under such conditions. Make the bottom a blunt V-shape, as in Fig. 6. Then a small stream will have a small channel. A slight obstruction will back up the water so fast as to remove it at once. In a word, what the engineers call the "scour" will be great. The culvert bottom will be largely self-cleaning, and when a freshet comes, instead of a dam being already begun and in position to catch any floating substance, there will be a clear water-way, in which it will be difficult for anything to lodge.

Finally, remember that when an engineer wishes to make the water flow slowly, to bring the current to a standstill he makes his sewer with a flat bottom. In this case, reform is cheap, and it also pays. Therefore, it is to be hoped that the farmers will reform, build more sensible culverts, and, as a consequence, have fewer washouts in the future than in the past.

BREEDING FANCY PIGEONS.

JOHN W. CAUGHEY, PENNSYLVANIA.

The pleasures of keeping fancy pigeons, like many other studies of nature, are little known in the rural life of America. Few, if any, farmers will speak a kind word for these feathered pets, and yet ignorance and prejudice are at the bottom of such feeling. Pigeons are unjustly accused of injuring the seed planted in the fields. They never upturn the soil in search for grain; it must be in sight upon the surface to attract their attention. An unruly bull will cause ten times as much damage as a pigeon could do; a dog will play havoc among a favorite flock of sheep; yet the farmer keeps both. Surely no comparison can be made between such vicious animals and an innocent feathered pet. The location of a pigeon-loft is a point of first importance. As with a poultry-house, a southern exposure is always desirable. Keep a few instead of too many. Never crowd them. We would select that portion of the barn nearest the roof, nailing the boards for the floor on the cross-beams over the hay-mow, reached by ladders extending up from below to one side, where a door of entrance is made to the pigeon-coop. The attic over the dwelling, or even the loft above the sheep-shed or spring-house would be suitable if sufficient room could be had. The barn is, however, the first choice. In Fig. 1 is represented the interior of the barn, showing the arrangement of the nest-boxes. Each box should be either on the floor, or a few inches above it. They should be made in sets of two, each twelve by twelve inches in dimensions, each set for a single pair of pigeons. For large pigeons, like Pouters, Carriers, and Fantails, a box fourteen inches square is best. Never cramp them in a small nest, or there will be broken eggs and rumpled tails. By using two compartments, the first young hatched can remain in the nest and not molest the old birds when they lay in the vacant nest and prepare to settle down to hatching a second brood. Fig. 1 fully illustrates the idea of the nesting compartments described, and experience has proved it the best. Either sawdust or soft hay or straw should be used for the nest, and are more largely used by pigeon-keepers than anything else. To my idea, hay or straw that is put into the coop should be cut about twelve or fifteen inches long; it is then of proper size to admit their carrying it to the nest and assisting in building. Of course the nest should be partly formed for them, as pigeons are not always capable of doing it properly. However, it is a pleasure to them to assist in building it, and certainly no more pleasing sight than to watch them do so can there be to the fancier. The floor of the loft is best covered with coarse sawdust. It is cleanly and soft to their feet. The droppings can be raked up once a week, and the sawdust, by turning over and raking, is as fresh as when first laid on. In a loft fifteen by thirty feet we would not consider it prudent to match and breed more than twelve pairs, and ten pairs would be better. It always causes quarreling when too many occupy the same room. One of the most successful pigeon-keepers I know of kept but five matched pairs in a coop of this size, and an experience of thirty-five years told him that this was the better plan to pursue. In the middle of the floor is an inclosure filled with sharp sand, which is renewed once in two weeks. In each corner of this inclosure is a box for loam or clay, old dry mortar, egg-shells, rock-salt, etc. All are necessary. When the pigeons are fed, the grain is thrown down in the sand, and they enjoy searching for it. Sand or grit they also eat, to assist in grinding the grain. Green food of one kind or another is provided once a week, removing it when it begins to wither. A bunch of lettuce or a small head of cabbage, hung where they may conveniently reach it, is about as good as anything of this kind. Sometimes a few onion-tops or a bunch of fresh clover hay in blossom are also good.

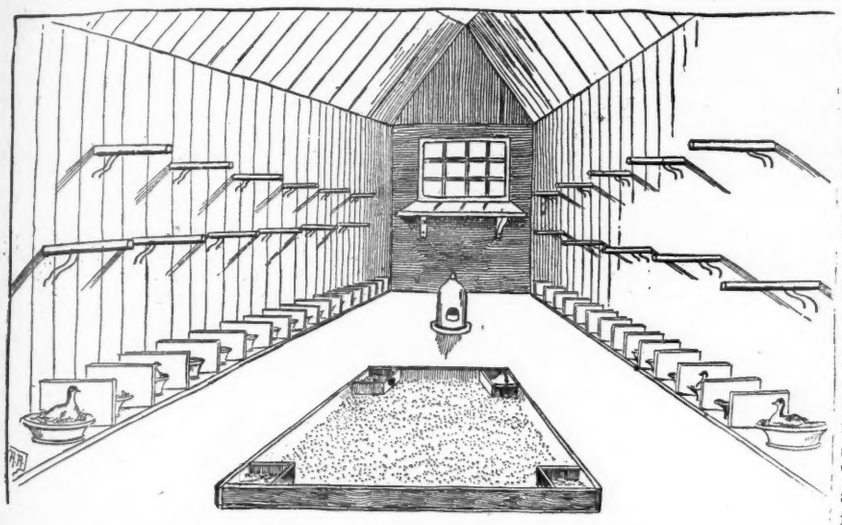


FIG. 1. BREEDING AND LIVING-ROOM FOR PIGEONS.

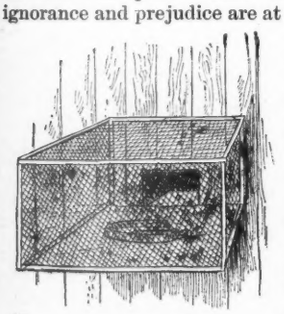


FIG. 3 WIRE AVIARY.

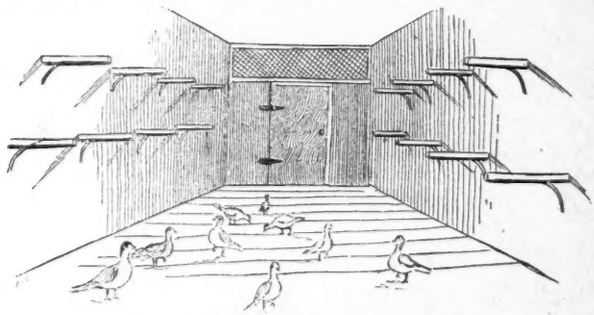


FIG. 2. ROOM FOR YOUNG PIGEONS.

The food for pigeons should be varied, although some above others are relished by the birds, and are better for them: peas, wheat, corn, vetches or tares, small beans, barley, buckwheat, bread, dried and crumbled. Hemp-seed and millet, as an occasional stimulant, are required when the birds are drooping or moulting heavily. The first-three-mentioned grains are really the best of all, although they will not do well on these alone. Some new delicacy is needed at least once a week. When the breeding-season comes, wheat, bread-crumbs, with every other day a feed of peas and tares. The latter are usually scarce, being imported from Great

Britain, and considered more of a luxury than a necessity, although they are justly considered the very best food for pigeons. When the young pigeons are hatching, the most easily digested food should be fed, to enable the old birds to accumulate soft food or "milk" in as large quantities as possible. This forces them to feed their young more frequently, causing the latter to grow with great rapidity.

The breeding-season usually starts in March, and ends in September or October, at which time the sexes are separated, to give them a chance to rest. They moult in August, and are frequently very weak. To mate a pair of pigeons, place the male and female in a cage large enough to give them plenty of room, with a partition separating the one from the other, as is shown in Fig. 3. The male makes a cooing noise, which in time attracts the female, and she will prance up to him, touching his head with her beak until he is fast asleep or feigning it. When this is done they are evidently favorable to mating, but they should be kept together for several days, to become well acquainted. After being satisfied by their actions that they are mated, it will be safe to turn them loose in the breeding-room or loft. They will soon after seek a nest and settle down to business. It is usually a week or ten days after being mated before the first egg is laid, and a day will intervene between that and the second egg. Usually the first set of eggs is worthless. This can be determined at the end of seven days by taking and holding an egg to the light. If the egg appears a bluish color, it is fertile; but if a thin, watery liquid is visible, it is worthless. The second set is almost sure to be good. The pair will each take turn at sitting, the hen sitting from about 2 P. M. until between 10 or 11 A. M. the following day, when the male relieves her. It takes eighteen days from the day the last egg is laid for the young to hatch. If they do not hatch by this time, the eggs have been chilled or in some way injured. Some pigeons are much more shy than others. This causes them to fly off their eggs and young at the least noise, and often remain away until one or the other is chilled to death.

The first day after hatching, the young pigeon is one of the most helpless of living beings. The first soft, milky food regurgitated into their crops by the parent birds awakens them, and they begin to feel that they have life. The more they get the more they want. They soon grow rapidly under good feeders, and at six or eight days old begin to show small pin-feathers, and in another week are well covered with small, half-broken nest-feathers. These continue growing until they are two or three months old, when they moult and come out with a fresh coat of better and stronger feathers. It is a good plan to keep at least two pairs of common or half-bred pigeons that are close sitters and good breeders, for many of the fancy pigeons prove very poor breeders and neglect their young. If these feeders lay or are mated and started at exactly the same time as the fancy pigeons, the eggs of the common and the fancy pigeons are exchanged, letting each incubate and hatch those of the other pair. It matters little whether the young of the common birds live or die. All that is needed is that the fancy birds feed off their soft food and avoid sickness. This they can do in about five days, and they will then become tired and desert their nestlings. The common birds will usually continue to feed the young ones they have charge of for about three or four weeks, when they will seek a nest and go to laying again.

As fast as the young become able to eat and fly about, have an extra room or coop in which to remove them. Such an apartment is shown in Fig. 2. They will not be liable to be persecuted by the older birds, and will come up stronger and better pigeons. It also gives the breeding-stock the room allotted to them at the beginning of the season. All unmated birds should also be removed from the breeding-loft to such a room as suggested for the young stock. An old hen or cock will give you much trouble unless this plan is adopted.

The best water should be supplied, this being as essential to health and success as good food. This is especially the case in warm weather, when the birds are breeding, and water soon becomes stale and unfit for drinking. A drinking-fountain is shown near the rear in Fig. 1. A wooden bowl (a shallow tub) should also be placed in the coop, or, what is much better, out in the inclosed aviary outside the window of their coop, where they can splash and wash themselves and not wet the floor or surroundings of the breeding-room. Fig. 3 represents such an outside aviary and bathing-dish. The water should never be over two or three inches deep. It takes but little for them to bathe, and this often prevents weak birds from being knocked about and drowned by the stronger when they get into the bowl for a bath. This should be given them about twice a week, and only on bright, sunny days. Nothing is so much enjoyed by the birds or as beneficial to their general health as a bath. We think the coop is not only more attractive when kept whitewashed at least once in three weeks, but the lime is beneficial to the birds, and they like clean, bright rooms. It has always been my plan to do this throughout the breeding-season, and I find it pays to do it.

INCREASE OF BEES BY SWARMING.

A. H. DUFF, KANSAS.

There is no method of dividing bees that will equal in profit natural swarming. If a moderate increase only is desired, to run an apiary for profit, little increase of stocks is desired, and, if any, to double the number is enough. To do this and receive the most profit, it is better for each colony to cast a swarm. No division that can be made by man will equal the first division made by the colony itself. A first swarm will gather more honey after being hived than any two divisions that can be made. It is a mistaken impression that swarming is a failure. It is the only correct basis for increase and the production of good queens. Better pay twice the price for a queen reared the natural way, fully matured, and produced by a strong swarming colony of bees. Any one starting into the honey season would better give more for one first swarm than for two divisions. I have practiced both methods and adopted the one presented. It will not pay to increase to any great extent unless there is an active demand for bees. Less increase always means more honey, and we must have this completely under our control. If only one swarm is allowed, we can prevent subsequent swarms by removing all but one queen cell, or, if we have a supply of laying queens on hand, we can substitute one of them, which is much better. If no increase whatever is desired, we must keep away all queen cells. Give an abundance of storage room at all times during the honey season. This not only goes a great ways in the prevention of swarms, but it is the key to large honey crops. We must not expect bees to store honey if they have no storage room. The old ideas of bee-keeping which still prevail among some bee-keepers as to surplus room is too limited. The surplus department should be as large as, and in many instances larger, than the brood-chamber. This is of the utmost importance. Almost any one that has kept bees in times past has learned that if bees occupy a very large hive they seldom if ever swarm. Hence, we should know that abundant room is a preventive of increase by swarming.

GREEN RYE FOR POULTRY.

WM. H. ALLEN, MAINE.

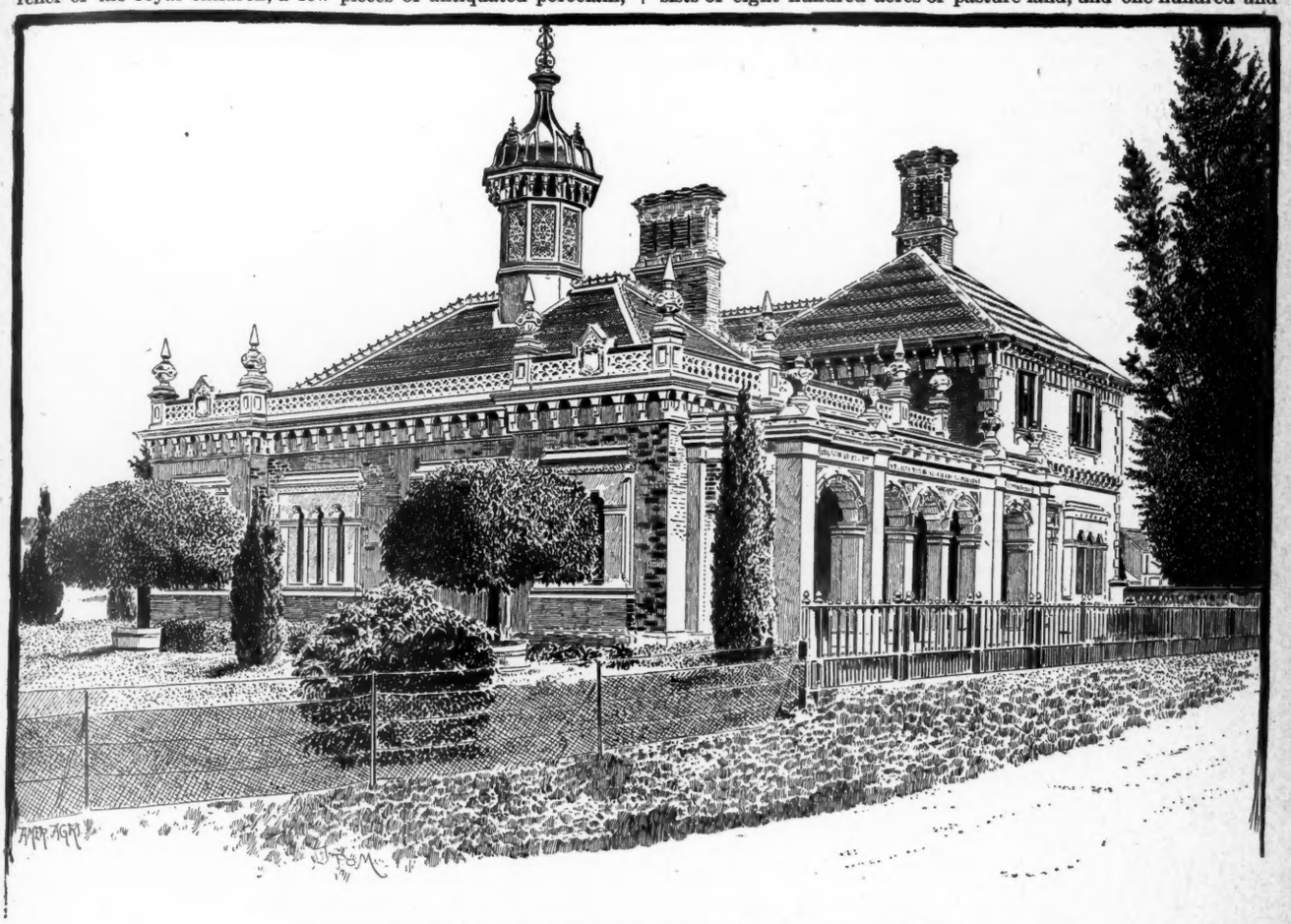
Rye, as all poultrymen know, is an excellent green food for poultry, and those who have adopted the system of changeable yards, so as to allow the fowls to occupy one of them while something is growing in the other, will appreciate its advantages, as one of the yards may be sown to rye. The poultry yard is already manured by the hens themselves, and so no hauling of manure is required. Rye remains green and succulent late in the season, and it also comes up early in the spring, but little warmth being necessary to start it. As it is cut off it starts again rapidly, and quite a large supply of green food can be raised on a small patch. The yield of the grain or straw is not taken into account. Begin to use the rye as soon as it is large enough. Do not turn the hens on it the first year, but cut it for them, or they will destroy more than they consume. Next year turn under the second yard, sow it to oats, or to something else if preferred, and turn the hens on the rye.

Discouragements in Keeping Poultry.—A man starting into business for himself knows there is a great deal of hard labor before him. Naturally he finds many discouragements. Perseverance will win, however. There is no royal road to success in keeping poultry. Fowls are liable to become sick, lay soft shelled eggs, or not lay at all. Young chicks may die of gapes or some other ailment; rats, minks and other rodents may kill them. These are all common stumbling blocks to success. The farmer can not expect more than he does when his crops fail. No class of people are so favorably situated for raising poultry as farmers. With plenty of room and grain, certainly two essential advantages are theirs. Do not blame the hens for lack of success. Determine to overcome the difficulty and the next effort will be a success. Never ask a farmer, of the far too common kind that keep no accounts, whether his hens pay, for he will tell you he does not know.

THE QUEEN'S DAIRY.

MISS MIDY MORGAN.

As all students of history know, Windsor Castle stands on a sharp bluff overlooking the river Thames, and in the midst of one of the most beautiful pastoral valleys in the world. The domain of this ancient stronghold has an extent of many acres, to practically use which the late Prince Consort established the Shaw farm within its boundary. One of the most interesting features of this is the Dairy, of which an illustration is given below. This building is of yellow brick, with sand-stone facings. It consists on the ground floor of the milk-room, the churning-room, and the scalding-room; the upper floor contains the rooms set apart for the use of the woman in charge; the milk-room is fitted up with due attention to labor saving. The walls and the floor are of subdued coloring, being lined with encaustic tiles; the shelves and the butter-table are of ordinary veined marble; the decoration though simple is in excellent taste, consisting of several small portrait medallions in bas-relief of the royal children, a few pieces of antiquated porcelain,



PERSPECTIVE VIEW OF THE QUEEN'S DAIRY.

and a small fountain at either end. In the center of one side wall stands the butter-table, on which presides a bisque figure of a nymph emptying a stone jar; the milk vessels are shallow white china jars of two gallons capacity each. The cows which supply the milk are milked twice daily, at 5 A. M. and 3 P. M. The milk is skimmed twice a day, and butter is churned on six days of the week, except when the court is at the castle; then, when required for immediate consumption, butter is made twice every day. The dairy herd numbers twenty head of Jerseys, beauties, all pedigreed cattle; to supplement these, thirty-five head of non-pedigreed Shorthorn cows are kept. These latter are equal in appearance to pure-bred Shorthorns. There is also a herd of pure-bred Shorthorns, sixty head in number, which are a comely lot. Some individuals of this herd are in progress of preparation for the coming summer shows, and later on will be exhibited at the Fat Stock Show, in Smithfield. The treatment of the cows in milk is as follows: They are put on pasture about the 15th of April for midday relaxation until the middle of May, when they range both day and night. Then, according to the state of the weather, they are brought in about the 15th of September, or the first week in October. They are allowed daily exercise at pasture until the second or third week in November, when they are finally taken up for the winter.

The dairy cows during the non-pasturing months of the year are fed three times during every twenty-four hours. The allowance is liberal, and consists of cut feed; the component parts are chopped hay, chopped roots (the yellow mangel is preferred) wheat bran, crushed oats, and about two pounds of corn meal subdivided through the three feedings. The cows which are in full flow of milk have daily in their feed an extra allowance of two pounds of linseed cake. A large lump of rock salt is kept in every manger; two cows stand in a twin stall and share a water tank between them. Extreme care is taken to keep the cow stables at an even temperature and fully ventilated; thus animal heat is economized and the capacity of the cow is increased as a milk-producing machine.

In March last one hundred head of young stock-calves and yearlings were in the stables of the Shaw Farm. This farm proper consists of eight hundred acres of pasture land, and one hundred and fifty acres of arable. There are in all on the Shaw Farm twenty Clydesdale horses; of these ten are mares from which three to five foals are annually obtained. The system in vogue is to sell the colts and to retain the fillies. The glory of the Shaw Farm is in its pigs; these are super-excellent. In one pen resides a Berkshire boar which is a gem in his family; the creature is dish-faced, of a most attractive countenance, his nose is upward, and absolutely perfect, being button-shaped, with a latent power for rooting equal to a double weed-grubber with a steam attachment; close by is his beauteous mate, and also near at hand are to be found many of their youthful progeny. There are some specimens of the large white Yorkshire, as also of the small Windsor Whites. To complete the Shaw Farm a pretty sheet of ornamental water faces an aviary where handsome breeds of poultry are kept.

As the dairy herds could not consume all the pasturage of the grass lands, a flock of four hundred head of cross-bred ewes is maintained. The animals are half-bred Cheviots and Leicesters. The fleece is medium and the mutton excellent. These ewes are bred to

Hampshire Downs, the lambs thus produced are sold fat toward the end of the season as "hoggets." In August the ewes are annually sold off, being then in good flesh and ripe for slaughter. In the same month also lean four-year-old ewes are purchased in the south of Scotland, which are shipped by rail direct to Windsor. A stringent reason for this change in the flocks is that the rich lowland soil causes the feet to become delicate, and more hardy flocks are needed to take the place of those fattened and sold off. Last March the lambs on the Shaw Farm which had one and all been dropped at pasture were in a most thrifty condition, being then about thirty days old.

An annex to the Shaw Farm is the Flemish Farm, two miles from the central range of its buildings. It consists of one hundred and ninety acres arable, and two hundred acres pasture land. Here the Clydesdale horses are bred and stabled; here also are herds of pure-bred Devon and Hereford cattle. The youngsters of this herd always prove easy of sale, as they are sought after for breeding purposes. The choicest individuals are retained to fill gaps in the parent herds. A herd of Tamworth pigs is kept on the Flemish Farm, the beauties of which rival but never eclipse their neighbors, the Berkshires at the Shaw Farm.

The combined resources of these two farms supply all the food needed for their herds and flocks, save what oil-cake is used; the soil being over-rich to grow oats. A wheat crop is preferred, the produce is sold, and oats bought.

VALUE OF BIRDS TO THE FARMER.

H. REYNOLDS, M. D., MAINE.

What is the money value of owls and hawks to the farmer? This question would be answered off-hand by many farmers that they did not regard them of any value, but rather as the cause of loss. Undoubtedly, owls and hawks do some damage occasionally, by catching a few chickens; this is the only light in which many regard these birds. Aside from the mischief they occasionally do, they are great destroyers of mice and insects. An owl will rid a barn or outbuilding of its mice, and pick up many field mice. Hawks also destroy large numbers of rodents. The Ornithologist of the Department of Agriculture estimates that each owl and hawk destroys at least one thousand mice per annum, or their equivalent in insects, and that each of these mice does at least two cents' worth of damage to the farmer every year. The thousand mice would thus cause twenty dollars' worth of damage a year if not taken out of the way by the owl or hawk. The services of each owl or hawk to the farmer each year are worth twenty dollars. These birds would have to kill off a good many chickens to offset the money value of their services to the farmer.

Some State legislatures have been foolish enough to offer bounties for the destruction of certain birds. Pennsylvania, in 1885, passed an act called the "Scalp Act for the Benefit of Agriculture," which provides a bounty of fifty cents for each owl, hawk, weasel, or mink killed within the limits of the State. The first year and a half this act was in force the State paid $90,000 under its provisions —all for the purpose of protecting the chickens from destruction. Supposing five thousand chickens were destroyed yearly by owls and hawks in Pennsylvania, and that they were worth twenty-five cents each, the total value would be $1,250, or $1,871 for the year and a half, to save which the State expended $90,000, and at the same time destroyed about 130,000 useful birds, whose services to the farmers of the State the Ornithologist of the Department of Agriculture estimates as worth over two million dollars each year! Hence, the State by its bounty for the destruction of useful hawks and owls caused a loss to the State of over two million dollars yearly to save $1,250 worth of chickens. A bounty for the destruction of crows in the State of Maine would, undoubtedly, prove just about as profitable as that "scalp act" did in Pennsylvania.

SPARE THE ROBINS.

The robin is one of the most useful of our common birds, notwithstanding it has the audacity to eat a few cherries, for which depredation it is often shot by the exasperated owner. Henry Ward Beecher once said: "The man who would shoot a robin, except in the fall, and then really and conscientiously for food, has in him the blood of a cannibal, and would, if born in Otaheite, have eaten ministers, and digested them too." The robin is one of the most useful of all our birds in destroying insects which are most injurious to fields and gardens. Robins rear two or three broods of young each season, and it requires large numbers of worms and grubs to feed them upon. The quantity of worms required by a young robin is surprisingly large, being more than its own weight daily. Sometimes the young are fed almost exclusively upon cut-worms. The horticulturists near Boston once petitioned the Legislature to strike out the name of the robin from the list of protected birds. A committee, one member of which was Prof. Jenks, was appointed to investigate the habits of the robin. Prof. Jenks clearly proved that the bird is a benefactor. From daily examinations of the contents of the robin's stomach, he found not a particle of vegetable food from early in March to the first of May. Nine-tenths of all its food consisted of the larvæ of the *Bibio albipennis*, of which from one to two hundred were sometimes taken from a single bird. This larvæ is very destructive, feeding on the roots of plants, injuring strawberry plants, vines, and other plants. The fly into which this larvæ develops hatches in May, and infests wheat and other products. A few robins in the vicinity of a garden are the best means of protecting the plants from the ravages of the cut-worms and other destructive worms and insects. A single pair of robins, in rearing two or three broods of young, must necessarily destroy a vast number of worms, grubs, and other insects in a single season. The gardener or farmer who would shoot a robin, or allow one to be shot on his premises, is strangely blind to his own interests.

THE WOODPECKERS.

The woodpeckers are supposed by some to injure the trees upon which they are seen to be at work, but it will generally be found that wherever one digs a hole into the bark or wood it finds an insect. If the insects which they find and destroy were allowed to go on unmolested, they would inflict far more injury upon the trees than the woodpeckers do. Flagg, the naturalist, alludes to forest tracts in Virginia and North Carolina, in which hundreds of acres were denuded by the larvæ of a species of the *Buprestidæ* (a borer of the beetle family), where a local warfare had long been waged against the woodpeckers, who were thought to be destroying the trees, but who were busily at work destroying the destructive borers. Some of the woodpeckers have been accused of piercing the bark of trees and injuring them by sucking the sap, but naturalists do not attribute any such habit to these birds. It will generally be found that it is not sap that they are after, but worms of some kind, or beetles, which injure the trees ten times as much as the woodpeckers can.

THE BIRDS THE FARMER'S BEST FRIENDS.

The birds, as a general rule, are the farmer's best friends. Their natural food, to a large extent, is composed of insects injurious to the fields and gardens. To have a swarm of hungry birds constantly about the farm, ever on the alert for all kinds of insects, is a great advantage. Some birds destroy hundreds of insects daily, and the work of such birds for just one day in spring prevents the subsequent increase of all those insects that are destroyed. Since insects increase with marvelous rapidity, the destruction of a large number in spring, when the birds find little else to eat, means far less insects during the year than there would be were it not for the destruction thus effected. In some instances, the birds have been nearly exterminated in certain sections by the work of bird-shooting matches, or in other ways, and the result has been an enormous increase of destructive insects, which made the inhabitants glad to welcome back the birds. Every farmer and gardener should take a little trouble to induce the birds to build their nests about their premises, by putting up bird-houses in the trees, or otherwise providing bird-nesting places, so as to have the aid of their services in destroying insects.

Profits in Broilers.—A number of New York hotels use from 3,000 to 6,000 chickens per month, and in the same time consume from 18,000 to 30,000 eggs. If a farmer who devotes his attention to poultry can cater to such custom he can make handsome profits, for the demand is always beyond the supply. To properly handle this class of custom, it is best to do all hatching by artificial means. Hatching at the rate of from 3,000 to 8,000 chicks every month, sorting them out as they increase in size, putting them in the market at twelve weeks old, keeping them growing and moving, are essential to profit. Ducks are also very profitable, costing no more to raise than chicks. When chickens sell for seventy-five cents a pair, ducks are worth $1.20. They are well worth keeping. Spring is the time to stock up. A few runs below the barn, with a comfortable, well-lighted house, will be necessary. All branches of industry require good management to succeed, and poultry-raising is not an exception. Do not make a mistake by going into it largely at first.

IMMEDIATE EFFECTS OF CROSS-POLLINATION UPON FRUIT.

How far the direct influence of the pollen of one variety or species of plants extends, when fertilizing another, is still one of the mooted questions in vegetable physiology. While formerly the theory that in crossing, or hybridizing, the seed only could be affected was generally accepted as a fact, more careful study of the subject, and closer observation have brought to light many striking instances of

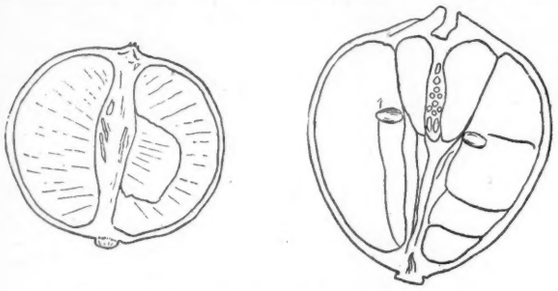


FIG. 1. SECTIONS OF LEMON ORANGES. FIG. 2.

changes in fruit for which the direct influence of the pollen appears to offer the only explanation. The most remarkable and convincing evidences of this kind which have come to our notice were recently received from Rev. Lyman Phelps, of Sanford, Fla., one of the most intelligent experimenters and successful fruit growers in his State.

Figs. 1 and 2 show cross sections of Villa Franca lemons, reduced to one-half of the actual size, grown on a lemon tree upon a fork of which the Sustain orange was budded. These two fruits grew directly under the Sustain branch the first year it bloomed, and showed a decidedly different appearance from those not crossed. Both were submitted for examination to Mr. E. S. Hubbard and to Mr. E. H. Hart, well-known experts in citrus fruits. Mr. Hubbard found the oil cells very peculiar, resembling the Early Oblong orange closely, except that about one-half of them had the Villa Franca indentation on the apex. The flavor of peel and acid was very much like that of the seedless Messina lemon, milder than the ordinary lemon, and peel less pungent. Mr. Hart writes us: "The presence of the orange was strongly manifested, both in outline and in the rind. There was a modification of flavor and tissue, suggesting a dash of orange at intervals." Fig. 3 portrays a vertical, and Fig. 4 a horizontal section, reduced one-half, of a Brazil Navel Orange, artificially crossed with Jaffa Blood pollen. This orange, Mr. Hubbard writes us: "Showed no core and no umbilical protuberance. In the middle of the orange, in place of core, was a single navel lobe, formed of odd-shaped cells, both slender and plump, meeting in the middle in the form of a whorl. There was one seed rudiment in this lobe, and some half dozen others were in the remainder of the orange. There were four outer lobes in which the pulp cells were very irregular in shape. They were plump and oval near the skin, strangely pointing inward from the bounding tissues, and interlocking in the middle. The whole cellular structure was that of the Washington Navel. The chief effect of the

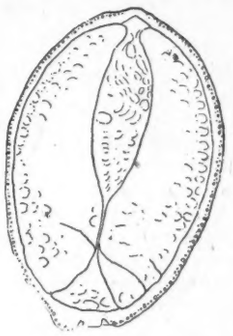


FIG. 3. VERTICAL SECTION OF JAFFA-NAVEL CROSS.

FIG. 4. HORIZONTAL SECTION.

Jaffa Blood, apparently, was in the shape, and in a peculiar ethereal bouquet which reminded one of the subtle flavor of the Rubricate."

Figs. 5 and 6 represent a natural cross of the Malta Blood with Washington Navel, of which Mr. Hart says: "It is an orange within an orange, with segments of fully developed peel running through four of the outer pulp sections, most of whose juice cells point inward, and interlock. The inner pulp segments are irregular in form and arrangement, and there is no core, properly speaking, except at the stem of the outer series where it is much enlarged. There were no seed rudiments in any part of this orange, and two small seeds only in the outer pulp near the blow end. The juice cells of the inner orange segments seemed to be most like those of the Washington Navel, while those of the outer were more tender, and about like those of the Parson's Navel, but not so melting as the Malta Blood. The flavor of the two parts was the reverse of this, and quite distinct. The inner had a smooth sub-acid resembling somewhat a sweet Rubricate. The outer was much sweeter than the difference between the juice at core and skin of an ordinary orange, having an ethereal Washington Navel flavor but more ravishing, owing to the tender pulp. The combination of the two, in eating, was finer that anything I remember." Figs. 7, 8, and 9 show a Navel-Mandarin natural cross, which Rev. Lyman Phelps informs us was from the summer blooms, and there was only one such bunch of blooms on the Mandarin tree. The next tree to the south was a Washington Navel, and the bees worked alternately on the cluster of the bloom on the Navel and on the Mandarin which

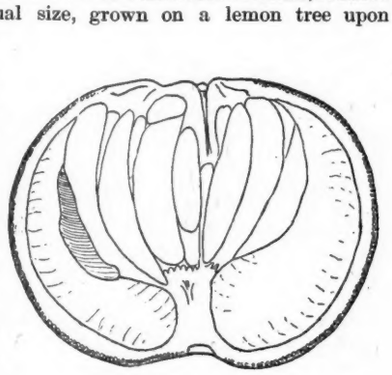


FIG. 5. VERTICAL SECTION OF MALTA-BLOOD NAVEL.

FIG. 6. HORIZONTAL SECTION.

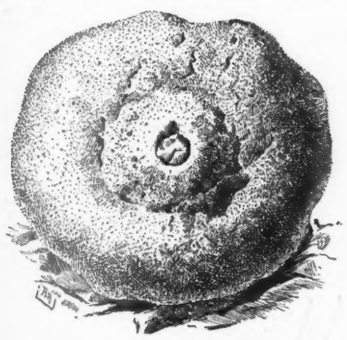


FIG. 7. NAVEL-MANDARIN, BLOSSOM END.

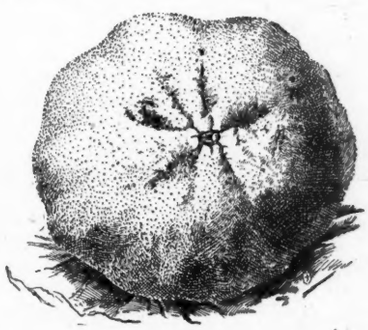


FIG. 8. NAVEL-MANDARIN, STEM END.

FIG. 9. CROSS SECTION OF NAVEL-MANDARIN.

were not more than six feet apart. There were in all four fruits of this character. Of the specimen submitted to Mr. Hart he writes: "The peculiar mellow sweetness of the Navel was unmistakably there, combined with the spicy aroma of the *Citrus nobilis*. I thought I had seen Navel-Mandarins before, but when I marked the perfect blending of the two types, I take it all back."

The specimen received at our office, and after which the accompanying engravings (reduced to one-half natural size) have been made, was certainly the most remarkable and interesting fruit that has ever come to our notice. It was as much a Navel as a Mandarin. While the characteristics of the Mandarin lines at the stem end were unchanged, the Navel mark at the point was as pronounced and broad as in the pure variety, and the Navel portion of the fruit matured slower than the rest. The fruit was considerably heavier than a pure Mandarin of the same size, and in every other respect it was a complete combination of the characteristic features of both varieties. If seeing is believing, it would be difficult to explain how any one who has seen and examined these specimens can still doubt the direct and immediate influence of pollen upon fruit.

CASSAVA.

J. M. MURPHY, FLORIDA.

Botanists recognize nine species of the Manihot—the true name of the Cassava plant—but of these only two are cultivated, namely, the *M. utilissima*, or poisonous kind, and the *M. aipi*, or sweet. Both have nearly the same chemical composition, but the former is deemed the more productive, and is, therefore, that planted most in South America, where cassava bread is the chief food of the people. The sweet species only is cultivated in Florida, and is well adapted to feeding horned cattle, swine, fowls, and horses, and making tapioca, cassava, and flour. It may be as well to add here

FIG. 1. CASSAVA PLANT.

that the name cassava should only be applied to the purified starch obtained from the roots of the plant known as mandioc, *Janipha manihot*, *Jatropha manihot*, *M. aipi*, and other names.

The fleshy root yields not only cassava and tapioca, but is the basis of several fermented liquors. The leaves are also boiled and eaten in South America, where the manihot occupies about the same position that wheat does here. The plant is somewhat similar in appearance to the castor-oil plant. The stem is smooth, woody, and bears leaves on the extreme tips. The stalk varies from three to six or more feet in height, according to the richness of the soil. One of the most marked characteristics of manihot is the large quantity of materials it contains which are soluble in alcohol. It yields a starch equal to the best corn, pound for pound.

Being exceedingly rich in carbonaceous matter, chemists claim that it could be more profitably employed for manufacturing glucose than starch. Some persons say the boiled root is equal to potatoes, but I could never be induced to think so, it being too fibry, dry

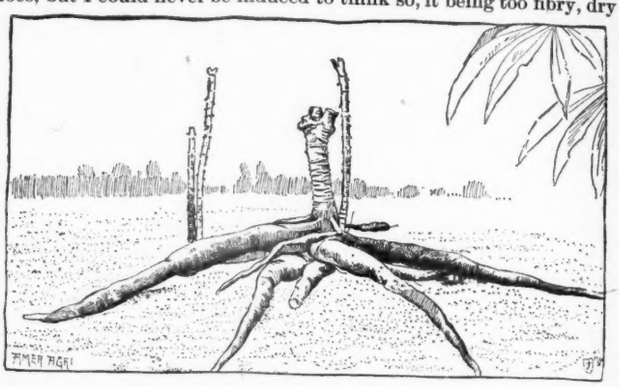


FIG. 2. CLUMP OF CASSAVA ROOTS.

and "choky" to make it pleasant to my palate. It is well adapted to feeding and fattening domestic animals, however, as some of them devour it greedily, and never seem to weary of it. The root is very productive, yielding from 1500 to 2000 bushels per acre, and supplying as much food as six acres of wheat. Bahamians live largely on manihot flour, it being the chief food of the farming class. To make it into flour, the root is first peeled, chopped into thin slices, dried in the sun, then pulverized.

Floridians get both starch and flour out of it. They leave the root in the ground until it is required, then dig and wash it, remove the peelings, grate the inner part, and wash the pulp. The water is next poured into another vessel and allowed to stand until the pure starch settles in the bottom. This water is again drawn off, and the starch allowed to dry and bleach. The washed pulp may be made into puddings immediately, or dried in the sun and turned into flour, which keeps fresh and sweet for a long time. This can never replace our cereals, however, owing to the small amount of nitrogenous matter it contains, that being only 1.31 per cent.

Tapioca is the product of the poisonous species. The juice of that plant, when permitted to settle, deposits the starch known as the Brazilian arrow-root, and from this the tapioca is made by torrefying the starch on hot plates until the grains swell, burst, and agglutinate. A sauce called cassareep, and an intoxicating beverage known as piwarrie, are also products of the Cassava root, so it is quite evident that the plant has excellent qualities enough to make it worth cultivating.

To produce large crops, fertilizers must be used liberally. The plant is propagated by cuttings of the stalk, which are planted about four feet apart each way. Cuttings are made about four inches long, and are entirely covered with soil. After the plants appear above the surface, the ground is kept cultivated similarly to corn; but after the roots grow larger, only very shallow cultivation can be given. [Fig. 1 shows a growing plant, and Fig. 2 a clump of roots exhibited at the semi-tropical exhibition at Ocala. The largest root of the clump was four feet long.]

POTATOES BY IRRIGATION.

S. W. SHAFER, CALIFORNIA.

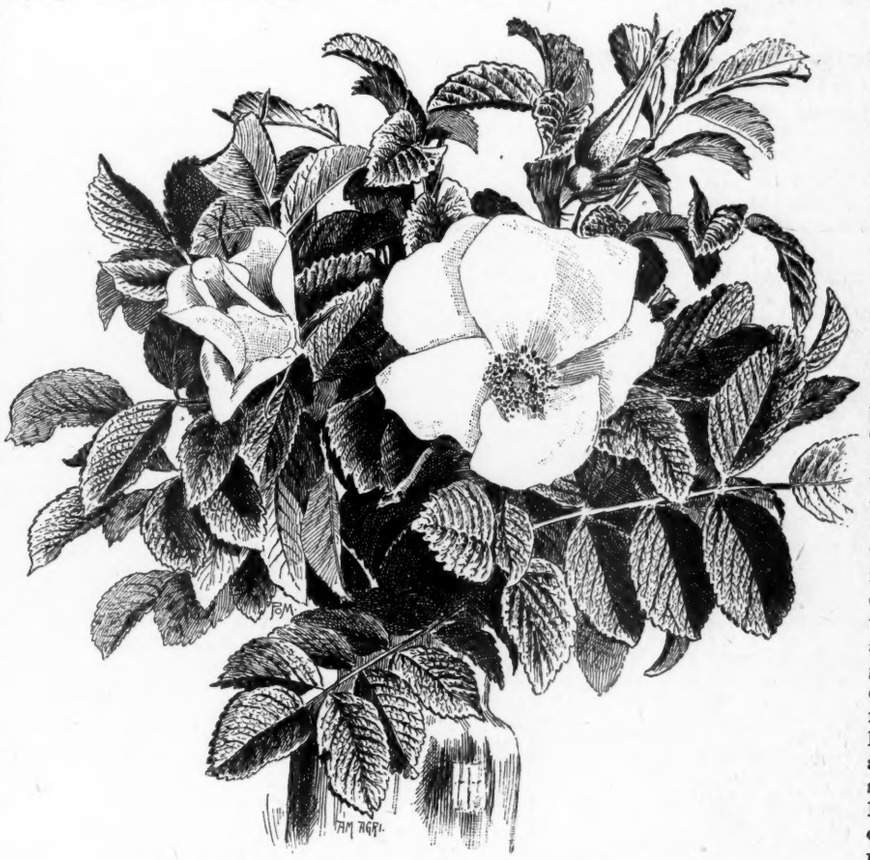
The potato prizes of the AMERICAN AGRICULTURIST have brought out many valuable points concerning potato culture, and left little more to be said. Yet I have a somewhat different process from any hitherto published. My soil is naturally poor and clayey, with hot, rainless summers, rendering irrigation necessary. I plant on clover sod; fertilize with a compost of forest leaves and stable manure spread on the sod. I let the grass grow till planting time, then plow and harrow as long as the harrow does good work shaking sods to pieces; then cross-plow and harrow as before. This leaves the ground a mixture of fine soil and rough, half wilted sods. Some fine manure will be found in the grass of the sods where it was spread, but most of it will have become thoroughly incorporated with the soil. I now strike out furrows as deep as the first plowing, on a water grade for irrigation, turning the soil down hill

with a side-hill plow, and going twice if necessary. I drop my seed twelve to sixteen inches apart in the bottom of the furrow, and one follows on hands and knees who piles all the sods he can find inverted in the trench, taking care not to put a tough, heavy sod on top of a potato. This is no job for a lazy boy, but needs the most careful hand. Nothing remains but to cover sods and potatoes by the hoe, with fine soil, and turn any remaining seeds against the side of the row. Some grass will sprout up in a sickly way, which the first hoeing will about clear out, and there will be very few weeds. The sods hold water like sponges and keep the soil loose and cool, while they furnish an all summer supply of plant food by gradual decay. I have, in this way, raised twenty thousand pounds of potatoes to the acre, smooth and free from disease. In some parts of the three thousand miles between me and New York, my plan ought to be good besides here.

ROSA RUGOSA ALBA.

H. W. HALES, NEW JERSEY.

There are probably few hardy shrubs more valuable than the subject of the accompanying illustration. Possessing, as it does, a strong, hardy constitution, splendid habit of growth, sweet-scented flowers, beautiful rich foliage, and bright scarlet fruit, it certainly must in time become a universal favorite, and it is somewhat surprising that it is not now more generally grown. Being a native of Japan, it will stand the coldest weather without any protection; in fact, I have never known it to suffer the slightest in winter, and it is superior to the pink variety in that it blooms the entire summer. The growth is usually of a strong, burly habit, and old plants in rich soil frequently attain a height and breadth of four or five feet. One plant, in the grounds of the writer, attained a height of six feet, and diameter of eight feet, and was the admiration of all visitors. The leaves are of a very dark green, with a peculiar metallic luster which gives a very rich appearance and sets off the flowers to great advantage. The flower buds are borne in terminal clusters, and, before opening, the buds are very long and graceful, of a delicate blush color which changes to pure white when fully open. The flowers measure from three to three and a half inches in diameter and have a delicate sweet-brier perfume. After the flowers have fallen, the hips or seed-vessels grow and attain a size of about an inch in diameter, and their brilliant scarlet is not the least attractive feature to lovers of the beautiful. They look almost like so many small apples, but of a much more brilliant color.



CLUMP OF THE WHITE RUGOSA ROSE.

Care of the Strawberry Bed.—Immediately after bearing, the strawberry bed requires attention. The mulch should be removed, weeds pulled out, and a liberal dressing of manure applied. If the plants are grown in hills, all runners have to be cut off. In the alternate row system the growth of the runners is encouraged so as to fill all the bare space. When this is well covered the old rows are spaded under. Old beds overrun with grass are not worth the trouble of renovating; better plant a new bed as soon as well-rooted young plants can be obtained.

HOW FERNS ARE PROPAGATED.

EDGAR SAUNDERS.

The demand for greenery by the florists has brought prominently forward the growth of an extraordinary quantity of the fronds of ferns, particularly those of the genus *Adiantum*, or maiden-hair. In every large city extensive greenhouses are devoted to their culture exclusively. If we examine a mature fern, we find on each frond, congregated together, small dark patches or capsules. In the maiden-hair ferns these are on the margins; in other genera they are in dots, or other forms, on the lower side of the frond. After they have ripened, these *sporangia* burst, and close inspection with the aid of a microscope shows them to be filled with a powdery dust. Unlike other plants, ferns have no flowers. This spore dust is analogous with the pollen grains of flowering plants, and, under favorable circumstances, is capable of propagating organic life after its kind, beyond the power of true seeds.

The professional fern-grower uses box-frames like those used for the common hot-bed. These are set in the ordinary greenhouse, except that it is highly desirable to have a strong bottom heat, particularly in winter. Light soil or leaf-mold is placed on the bottom. Upon this is spread a thin layer of broken sphagnum moss, or granules of cork, the spores vegetating freely on any substance where moisture is ever present. From good, matured fronds these spore clusters are gathered, dried, and then broken up into a powdery mass, and are sown over the space, without any covering whatever. In this close, dank atmosphere no change is perceptible for a month or five weeks, when, upon close examination, little green cups will be seen spreading themselves, slowly at first, but increasing day by day, and that to the eye have all the appearance of the green lichens that cover all moist surfaces. But shortly a little round knob, with a thin hairy stem, is seen to shoot forth. In a little while another growth slowly uncoils, with more of a flat, leafy appearance, followed again by still others, and then the generic character of the fern becomes readily distinguishable to the practiced eye. By this time, if the spores be good and the atmosphere suitable, the young plants spring forth in myriads, covering the entire space with delicate greenery, beautiful to the eye. As soon as they are large enough the florist picks them out and sets the plants singly into little thumb-pots, and the young life is complete. It takes, however, nearly three months from the sowing of the spores to grow strong young plants.

Those wanting only a few, or amateurs, can raise ferns equally well from spores in a common flower-pot, with a space of two inches left between the surface and the rim, covering the top with a pane of glass.

Preparing for Flowers in Winter.—Many lovers of flowers become so attached to their geraniums and other house plants that they keep them from year to year. This is a mistake. It is far better to strike cuttings in summer, and raise strong, thrifty young plants every year, leaving the old misshaped ones in the ground.

HOUSEHOLD

A Boy Who Was Egged Through College.

WEBB DONNELL.

Ned Anderson had finished his preparation at the academy and wanted to go to college, but whenever the matter was referred to the Committee on Ways and Means they brought in a very gloomy report. The little village in which the academy was situated was near the Maine seashore, and every summer was well filled with visitors from the city. Ned's home was on a farm about a mile from the village. One day during the noon hour he heard the proprietor of one of the two summer hotels in the place complaining to a friend about the difficulty of securing good eggs. "Why," said he, "I had five cases down from Portland yesterday, and one quarter, at least, were unfit for use, while the rest were too stale for nice cooking, and you know our business is affected a good deal by the taste of the food." His friend expressed surprise that with a farming community so near he did not get his eggs at home. "Well," said the hotel man, "the eggs are gathered from many of the country towns not oftener than once a month. Occasionally, a family will be away, and their lot goes over until the next round of the egg-team. By that time you can imagine in what condition they are. In any case, these eggs will be but little better than those from the city, while the advantage in using the city eggs is that I can get them just when they are wanted, and in just as large or small lots as are wanted."

When Ned heard this, the Committee on Ways and Means had another session. In fact, it remained in session for several days. Finally, Ned's father was summoned before the Committee as counsel. The result was that Ned appeared before the hotel man shortly after to make a proposition. He told him that he had heard him speaking of the poor quality of the eggs he was using, and that if he would agree to his terms he thought he could supply him with fresh eggs, and in such quantities as he desired. The terms were these: Ned was to be paid three cents per dozen above the city market rates, and the eggs furnished were to be *fresh*. If any were found to be otherwise, Ned was to forfeit twenty-five cents for each one so discovered. So many dozens were to be delivered daily, and four hours' notice was to be given when any extra number was wanted. This proposition was very readily agreed to, since it occurred to the hotel proprietor that he could well afford to pay a few cents extra for eggs that he knew to be fresh, when of the cheaper sort he might have to throw away from an eighth to a quarter, besides paying freight on them from the city. The proprietor of the other hotel accepted the same terms, and Ned also found, by corresponding with a commission merchant in the city, that, when he might have any eggs gathered above the needs of the home market, he could dispose of them at a few cents' advance over market rates if he could satisfy the commission merchant that they were strictly fresh.

There was a horse and market-wagon at home that he could use a part of the time, and a neighbor had a horse that he could hire at other times at a low rate. At a cash outlay of a few dollars, a half dozen egg-cases were purchased, and operations were begun. The egg territory selected was the surrounding country within four or five miles of home. On going over the route for the first time, Ned told the farmers that if they would save their eggs for him he would call often and would pay them as much as they could get from other egg-teams, and a cent per dozen more, if they would agree to put in no eggs older than the date of his last call, that their freshness might be above suspicion. Those having eggs to sell were glad to dispose of them in this way; and so an undertaking was begun that proved highly successful. I do not mean that a very large sum of money was made by a very little work, but good daily wages (and usually rather more than day wages) did result throughout the long summer vacation. The collection of eggs from the route selected did not take all of Ned's time; so he was able to help his father somewhat on the farm, and thus preserve a feeling of independence. Every spring and summer vacation throughout his college course was spent in this way, and the money realized went a considerable way toward defraying such expenses as prudent management found necessary.

A Unique Vase.

CE DORA LIENELLEN.

A box of pretty grayish-green lichens removed from decaying fence rails, after a rain, which has moistened them, so that they will scale off in as large pieces as possible; another, of the stiff white ones, such as scallop the bases of old stumps; a pan of glue, needle and thread; pasteboard, and the wreck of an old goblet, or, better still, the stand of an old lamp, from which the bowl has been broken. With these materials and an hour's pleasurable employment, a very pretty vase can be made.

Cut a piece of pasteboard twelve inches long and five inches wide; or, it may be slightly larger both

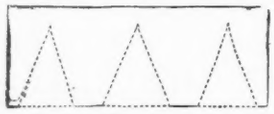


FIG. 1. PASTEBOARD FOR VASE.

ways, preserving the same proportions. Dot three triangles, as seen in the cut (Fig. 1). Remove these with scissors, and draw the edges of the strip together and sew in three flat seams. Fit this small opening over the top of the stem of the stand and tie securely. Use the white lichens and begin at the bottom, glue in rows, round and round until the vase and stem are covered; then crowd together as closely as possible the greenish-gray ones over the pasteboard, and finish around the top with a border of the white ones, arranged so as to give a scalloped upper edge. Tie a pretty ribbon in a loose bow, with short ends, around the joining of the stem and bowl of the vase. A glass of water may be set inside, and sprays of parlor ivy be allowed to grow and fall over its sides as it stands on mantel or window, or it may be used for cut-flowers, and it is quite pretty as a simple ornament with nothing else. A manifold number of shapes will suggest themselves to any one, but the one described is so simple that it can be easily made by any one.

The lichens, like so many of the pretty things that claim our attention in our walks through the woods and fields, can be applied in many ways. An old letter-box, unsightly but valued because it was old, was made a thing of beauty by a covering

FIG. 2. THE VASE COMPLETE.

of lichens and a pretty bow of ribbon, which can be removed at any time to give place to some other form of decoration; yet they are quite durable, and will give pleasure for a long time.

A Convenient Household Article.

ELLA ROCKWOOD.

One of the most convenient articles for use in a family is a lapboard. It should be made of very thin, light wood, and may be stained and varnished, or painted as fancy dictates. The one in use at our house is forty inches long and twenty-four inches wide, with the corners evenly rounded and a place hollowed out at the center of one side sixteen inches long and ten inches deep to admit of its being held easily upon the lap. It is very useful in a number of ways: If you wish to baste the trimming on a skirt, take the board on your lap, slip the skirt over and you will find it much easier than stooping over a table. In sewing or mending it forms a convenient table. It is also nice for the little ones to gather around when they want to play dominoes, authors, or other quiet games. A hole near one end to admit of its being hung upon a nail when not in use puts it entirely out of the way.

Summer Styles.

We can not but realize the great revolution which has taken place in women's dress, within the last decade, when we study the fabrics now selected for summer wear. There was a time, not very long ago, when a thin cool cotton or linen material that would launder well was thought almost the only thing fit for use in warm weather, but now we find in most feminine wardrobes quite as many light-weight cloths and cashmeres, silks and flannels as prints and muslins; while even the ginghams and percales are made so elaborately that they are generally worn, at least a season, before being done up. Velvet, too, was once thought to belong exclusively to winter, but now appears as trimming on all kinds and conditions of frocks, some even going so far as to put velvet sleeves in cotton dresses, but this is questionable taste. It may be that our uncertain, variable climate has much to do with this change, and if the predicted cool summer be true to the weather prophet's promises we are likely, soon, to find the comfort of what might be termed "all-the-year-round gowns."

In summer woolens, fine cashmere is a far wiser purchase than the somewhat thinner nun's veiling which is apt to become shiny; while it is better suited for the jaunty jacket-waists with the long, button-trimmed coat-tails, now so much worn. In colors, the "fad" for gray continues, especially the pale French gray, with silver or gold galloon for trimming. Soft *mode* shades, however, are close rivals of the fancied neutral tints and heliotrope, army-blue, and old rose are charming for youthful maidens with fresh complexions. Elderly women will rejoice at the revival of the once popular black iron grenadines and will make them up over silk or glossy satine and trim with lace ruches or else jet galloon and fringe. Younger ladies will have them combined with colored satin; as green, porcelain-blue, or the very smart mushroom tint. The bodice and skirt open in front over a vest and set in underbreadth of the brighter fabric; but the back of the dress must be all black throughout, and the foot of the skirt edged with a narrow ruche of lace.

Outing-dresses are a necessity in this day of athletic sports, especially for those living in the country, and for these striped and plain flannel or serge are prettily combined, a jacket bodice being made of the plain goods while the striped material forms the skirt and sleeves. Thus, a jacket-waist of plain hunter's green is stitched with white in two rows near the edges, has a habit back and open, pointed fronts, finished with a short revers collar. When thrown open the jacket reveals bias green and white striped vest fronts set on a lining, in two folds running from the shoulders and meeting at the waist line. The space between these folds is filled in with a V of the plain flannel made in a single piece and hooked on the left side beneath the folds. The standing collar also hooks on the left side, and is stitched with white. The striped sleeves are bias, rather large at the top and have an inner band of green at the wrists. The straight English skirt has a bias front, very full breadths behind, and is bordered with a band of the plain material. Of course, this same model can be carried out in any desired colors.

Nothing, perhaps, is as delightful to wear on a warm day as a light foulard or India silk, and some of the new designs are sweetly dainty with their satin stripes and dots, bow-knots of waving ribbon, or scattered long-stemmed blossoms. These inexpensive silks may be as simple or as elaborate as is desired, and are very *chic* with a yoke, collar, and sleeves of ecru embroidery. A celebrated French dress-maker, however, has sent

over a stylish model, trimmed only with ribbon, that will commend itself to many. The foundation skirt has a ten-inch gathered flounce of the silk set on the foot, and is faced with the silk very high up on each side. The drop-skirt to go over this contains six straight breadths, hemmed and bound with three-inch gros-grain ribbon. The front breadth is laid in four deep plaits at the belt while the other five are gathered. On the left side the skirt is caught up twelve inches from the bottom, showing the flounce beneath and is plaited to a

FIG. 1. HOOD FOR ALL SEASONS.

single point, fastened by a rosette of the silk, high and far back below the hip. A similar draping is done on the right side, but lower down and further back. The waist is rounded in front and has a basque back with two short, square tabs neatly stitched. The right side of the front is gathered on the shoulder and in the arm-eye, and laps over on the plain; left side high on the bust where it is caught with a small rosette. Below, it is drawn in plaits to the end of the bodice and disappears beneath a fold of ribbon which outlines all the basque except the tabs. Ribbon surrounds the high collar, hooking on the left side, and frills of soft silk muslin fill in the V space in front. The mutton-leg sleeves are finished with a simple ribbon band and bow at the wrists. In making all dresses it should be remembered that the shoulders must be cut very short, and the sleeves set very high to have a stylish effect, while in remodeling old frocks, a full, high puff of the same or some contrasting material, placed at the top of an old-fashioned coat-sleeve will help to give the elevated appearance considered so desirable. Collars are either very high or very low, but the turned down Directoire frill is unbecoming to all but a few who have short, plump necks.

In trimming with ribbon or velvet the darkest shade in the dress goods should be matched for the garniture and there are divers ways of applying it. A two-inch ribbon is the best for most purposes. Three yards are used for edging the back of a waist and falling in loops and ends from a point behind. Laid around a high collar it should be slightly folded in the middle and lap in front with two ends, each four inches in length. Covering wristbands, it is tied in tiny bows on the inside seams of the sleeves. For round waists, the belt ribbon may be quite smooth and finished by a full rosette, either in the back or on the left side, Shoulder knots of ribbon are pretty on young girls' white or light-tinted frocks, and consist of many loops massed together, or else long bows and ends.

Many buckles, round, square, and long and narrow, are used for holding belt ribbons in place, or catching draperies. The steel ones are most preferred although jet, silver, and gold ones are also sold and worn. Hooks and eyes have largely taken the place of buttons as fastenings, but those who dislike the trouble of them use inconspicuous, round, crocheted buttons on wool gowns, and small lace ones on cotton frocks.

For trimming the fancy open-work hats and bonnets, small flowers closely bunched are more in vogue than large varieties, and are either in heavy sprays, set directly in front, or in wreaths which encircle the crown. Crowns are lower than ever and brims are wide in front tapering to "next to nothing" in the back. Simple bonnets and hats should always be chosen to wear with summer costumes, as when over-trimmed they appear heavy and vulgar. If you can have but one parasol let that be a plain one and of a color to accord with all your dresses. Little shoulder-capes of black lace or net are graceful additions to summer toilettes and are not expensive. The best style is a deep, accordion-plaited ruffle attached to a flaring, wired collar, with a ruche of lace set inside.

A Comfortable Hood of Cashmere.

MRS. EMMA SCHMIDT.

The exceedingly pretty and becoming hood, shown in Fig. 1, is made of white summer cashmere, lined with white Japanese silk, and has an interlining of soft crinoline. It is faced across the front with a bias strip of cashmere three inches wide, and is finished on the top with a heavy white silk cord, with pompons. A like cord serves to tie it under the chin. To make one, cut a pattern according to the diagram Fig. 2, which gives one-half of it. It should be twenty inches high in the back or middle, measuring from forehead to neck. The bottom edge, from the middle of the back to the front, should be eighteen inches wide. Cut the front in a curve measuring thirty inches from middle of forehead to the bottom of the front edge. The material, however, has to be folded through the middle and cut double. After the lining and interlining are sewed in and the facing finished, sew, about three inches above the bottom edge, a shirr, through which draw narrow white silk ribbons, and tie the same in the middle of the back. The dotted lines *a* in the diagram indicate the lines for the shirr, and the short, inclined line *b* shows the crease where the front edge is turned back. Then make the folds across the front, about three inches below the edge, by plaiting in two-inch folds the crosses *c*, upon the dot *e;* the crosses *d*, in one and one-half inch folds, upon dot *d*, and the crosses *e*, also in one and one-half inch folds, upon dot *e;* and last, make a three-quarter inch deep fold by plaiting cross *f* on dot *f*. Then arrange the box-plaits thus formed, as shown in the illustration, and with a few stitches fasten them back upon the hood, and finish it by sewing the heavy white silk cord and pompons in loops and ends over the seam.

Passementerie Lace.

FRANCES H. PERRY.

First row—Chain seventeen, one double crochet in eighth stitch from the hook,* chain thirteen, one double crochet in eighth stitch from the hook, repeat from star, chain one, turn.

Second row—Six double crochet in loop, eight chain, one single crochet in top of last double crochet (taking up two threads—as a picot is worked), five double crochet in last half of loop, * chain two, one double crochet in middle stitch of five chain, chain two, five double crochet in next loop, chain eight, one single crochet in last double crochet as before, five double crochet in rest of loop, repeat from star once, chain two, pass two, one double crochet in next, chain two, pass two,

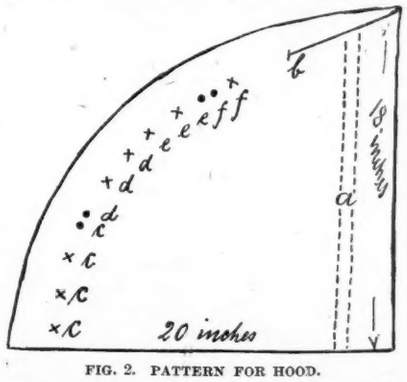
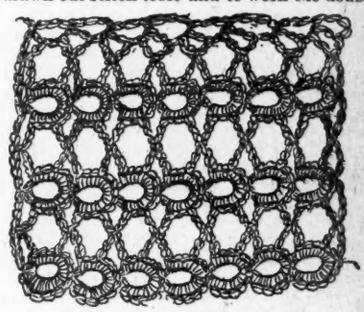


FIG. 2. PATTERN FOR HOOD.

one turn in next, chain two, one turn in same stitch, chain five, turn.

Third row—One turn in first two chain, chain two, one turn in same place, one turn between third and fourth double crochet in the thick ring (the second one from the projecting, empty loop), chain two, fill loop (*every* loop is filled as follows: Five double crochet, eight chain, one single crochet in last double crochet, five chain—except at the lower edge or border where six double crochet are worked to make the edge a little heavier), chain two, one turn in second stitch from the end of the loop just worked into (in the thick ring in the preceding row), one turn between the third and fourth stitches in next thick ring, chain two, fill next loop, chain two, one turn in second stitch from the end of the loop just worked—as before, one turn between third and fourth stitches in last thick ring, chain two, fill first half of loop and make the eight chain and one single crochet as before—then draw out the stitch on the hook as long as the last half of the loop and work one double crochet into the stitch of loop nearest the thick ring in preceding row (being careful to leave the drawn-out stitch *loose* and to work the double



PRETTY CROCHETED LACE.

crochet closely), chain one, turn, six double crochet over the chain and the straight threads together so that all are covered and the ring just like the rest, one single crochet in center stitch where the next loop starts from the ring just covered, chain one.

Fourth row—Six double crochet in first half of loop, then go on with the loops and the spaces between them just as the third row was worked until the last loop is filled and the two chain and one turn made, then work the next turn into the loop made by five chain at top, chain two, one turn in same place, chain two, one turn in same place, chain five, turn.

Fifth row—Same as the third row.

This lace may be made wider or narrower, to suit the purpose for which it is designed. When a piece of lace is as long as desired, omit from the last row the loops made by eight chain, then turn and work back just as you otherwise would only where the loops are missing work a double crochet between the fifth and sixth stitches of rings; the illustration shows the beginning and end of the work.

Always be Neighborly.

J. W. DARROW.

If the accommodating spirit is anywhere commendable it is between neighboring farmers. The selfish, unaccommodating farmer no one likes. You may go to him in urgent need of some tool or implement, and he will tell you he doesn't care to lend; he may want to use that very tool himself (although he knows he will not). Such a man never lacks for an excuse. You go away, and with what opinion? That he may keep his tools, and that he is not your neighbor, although he may live within a stone's throw of your own house. Sometimes there are overfrequent borrowers, who prey upon their neighbors as a leech preys upon the blood of an animal, but of such I am not now speaking.

The helpful hand is filled with blessing. There are many times in the course of a year when each may serve the other a good turn at no inconvenience to one's self. It is harvest time. Your neighbor has a few loads of hay or grain out in the field, and there are signs of a coming storm. You have an hour or two at your command. Will you drive your team over and "lend a hand," or will you not? Your neighbor has a sick animal, and you have some knowledge of what remedies might be given. Will you offer your services, or will you wait until he offers to pay you for them? If you are his neighbor in the true sense of the word you will give but one answer to the question.

Then being neighborly means to be peaceably disposed to one another. There *are* farmers who sometimes quarrel, and there *are* farmers who have been known to have lawsuits with one another, but they are not neighbors; they lack the neighborly feeling. It is said that some people are happy only when miserable; so there are some

farmers who are never at peace except when at law with some one.

The farmer's life is one where little courtesies are appreciated whenever rendered, and one where each may often be helpful to the other. In a thousand ways this is true. It may possibly be to your interest here to be selfish, stingy, mean (which I do not for a moment believe), but it is a thousand times better to so live and act your part in life that when you leave the old farm at last somebody may have a good word to say of you—that you were at least a *man*.

A Woodland Bracket.

CLARISSA POTTER.

The children brought in from the woods, one day, a great shell-like fungous growth, that they had chipped from the decaying trunk of an old maple. "See, Mamma! What a pretty toad-stool shelf!" they cried, thrusting this new woodland treasure between my eyes and work. The shelf was shaped like a concave, semi-circular fan, with crinkled, curving edge and a pearl gray base, ridged with waving scallops like a spread fan. On its left-hand corner, growing to the woody spine that had joined the toad-stool to the tree, was a second shelf, a dainty little round-lipped bracket, jutting out just above that corner of the brown, satin-lined shell. "Please hang it in my room, Mamma, for a comb-case," the little boy pleaded, holding the pretty rustic bracket against the wall. Acting on the suggestion, I hung the shelf by three exact lengths of picture cord, tying a large knot in the end of each length before stringing the shelf on them through the holes punctured in the center edge and at each rear corner of shelf, thus holding it firmly in place. A semi-circular, fat little pincushion I covered with garnet colored satin, with a border frill of lace, and glued it on the dainty toilet shelf of the bracket, filling it with a generous supply of pins and needles, and laying on the wide concave shelf, that the little fellow proudly hung close to the glass in his room, not only brush and combs, but pencils, and chalk, and thimble, and two spools of stout thread, black and white, for the stitches that often need early taking, the stitch that saves nine, in bedding, and in a boy's wardrobe.

A Decorated Jar.

DORA OSBORNE.

A dainty and pretty ornament may be made from an ordinary glass fruit jar by following the directions given below: First, select your jar and wash it thoroughly, so that it is entirely free from dust. Then mark a line midway between top and bottom. With oil colors paint all below the line a soft delicate blue. (Robin's egg blue would be pretty.) With gold, paint the upper part of the jar, the top included. Then from the upper left-hand side make a trailing design of pink and white blossoms, running down over the gold and on into the blue space. Tie a blue ribbon around the neck, making a dainty bow just above where the stems of the vine begin. The branches are of brown; the blossoms pink and white; no leaves are necessary. Vandyke brown and burnt sienna are used to paint the twigs, while crimson lake and white are needed for the blossoms. These colors come in little tubes and can be bought for from seven to ten cents a tube, except the crimsons, which are a little more expensive. A camel's hair brush will be required to paint with.

HANDSOME JAR.

The Power of the Will.

LILLIAN MAYNE.

The idea once prevailed that a boy could not be properly trained except by "breaking his will." Now, people have become wise enough to see that a boy must be led, not driven, in order to make of him the noblest man possible. That very will-power which the father formerly believed it his duty to "break" is now recognized as one of the boy's most valuable possessions, when he is taught to control it. It is this power, or the lack of it, that will make him intellectually a giant or a pigmy; that will make or mar his future; that will prolong or shorten his life. Determination, accompanied by energy and perseverance, is sufficient to accomplish anything short of the impossible. If a man is determined to accumulate wealth by making everything bend to that object, he will become wealthy, but it may be that he might have exerted his will in a better cause. If he determines to hold a high position in the social, political or intellectual world by concentrating all his powers upon that one object he can often attain it.

Some people look about them and wonder how such a man has done so much, or how a certain woman has accomplished so much in life. I assure you that it is by no spasmodic efforts that great things are done, but by steady, willful perseverance. I often look with admiration upon an elderly woman of my acquaintance. When comparatively young, she was left a widow, with four little children, and almost penniless. She has kept those children under one roof; has fed, clothed and educated them; and to-day they are all holding honorable positions and making happy the last days of their mother. Can any one measure the amount of will power required to carry that woman through years of poverty and toil until she has reached an era of comfort and rest?

If I were the director of a boy, I would let him know that the world is before him, and that upon the exertion of his own will in the right direction depends his future. Nor would I teach a girl very differently. A weak woman is no more admirable than a weak man. If she is obliged to go out into the world as a bread-winner, strong will power will carry her over many a discouragement under the burden of which a weaker woman might sink. If a husband and children are to be her good fortune, her home will be the more wisely directed for having a woman of strong, well-controlled will at the helm.

If these words should meet the eyes of any one who is despondent and ready to give up the battle of life, let him gather his forces together, buckle on the armor of indomitable will, and go forth to conquer.

How Hannah Had Her Way.

HANNAH'S HUSBAND.

My wife is a splendid cook, and on a certain spring day I had even a better dinner than usual. Of course I felt good-natured. It was just then that my wife inquired:

"Are you going to use that old Buckeye machine piled up in that corner? And will you give it to me? It—it's so unsightly!" I looked at Hannah in astonishment as she added hurriedly, "I would so like to clean up that corner. Give me the old iron; the old machine is only good for firewood!"

"But," I say in protest, "I have not time to take it apart. There are all those bolts and burrs—"

"O," she replied, "I'll see to that. We'll save all the bolts and nuts and take it apart. Little Phil is dying to use his new ax. Say yes, dear."

Of course I said "Yes," but added, "Do be careful, Phil," and wondered why Hannah did not ask for a new bonnet on the strength of such a glorious dinner.

But honest shame takes possession of me as, from my work in an adjoining field, I see two patient little figures hard at work over that old Buckeye nearly all the afternoon, and hear the rather feeble strokes of little Phil's ax. So, unhitching my team early, I march home, shoulder my ax, relieve my faithful pair of workers, and take possession of "that corner" myself.

What a pile of old iron that old "Buckeye" represented! Our woodpile also received a fresh deposit, to say nothing of bolts and burrs relegated to their place in the workshop. It really seemed—to use Phil's delighted expression—as if "the yard was three sizes larger."

The morning brought a modest invitation from my beloved partner to "plow that corner, dear, at your earliest opportunity. It is so near to the house I have decided to make an asparagus bed of it. It will be so handy to throw all the pickle and pork brine on, and I have sent for the roots. We can get them when we take the old iron to the foundry."

Actually, Hannah has made a very fine thing of her noonday bargain with me. The old Buckeye iron proved a magnet for all the old iron on the place, all of which she claimed. Of course some of the inquisitive lady readers will ask "what it brought." A platform rocker! a new bonnet! a good stout wheelbarrow for little Phil! a new book!

Hannah is now seated in the rocker, with the blandest expression on her face, reading and making running comments something like this: "Say, Paul, don't you wish we could live till 2000 and sleep so as to wake up in New Boston?" And she is getting actually rich from the proceeds of that asparagus bed. Women are so generous that I confidently expect that she will buy *me* a rocker next Christmas with the spare cash in hand. O, it pays to give women their perquisites and walk good-naturedly into their little "snares."

A Pretty Sachet Bag.

DORA HARVEY VROOMAN.

A very pretty little sachet bag may be made by taking two pieces of contrasting ribbons, each half a yard long. Overhand them together, placing cord to cord, leaving about two inches loose at each end. Then double them back, forming a bag, but allowing the two back ends to extend a little beyond the front ends. Embroider, with heavy floss, a vine of feather-stitching where the two ribbons join. With the same floss, in button-hole stitch, fasten the sides of the bag. Fill with cotton, adding sachet powder, and tie with a narrow ribbon a few inches from the top. This leaves the four ends (which may be cut to suit the fancy) loose at the top of the bag. Pale pink and blue ribbons, embroidered with dark maroon floss and tied with pink or blue would be pretty. Scent with heliotrope or wood violet.

SACHET BAG.

How to Cook Meat.

MRS. M. C. HUNGERFORD.

The best methods of cooking meat are not practiced in ordinary kitchens because the reasons for certain procedures are not understood. For instance, a piece of meat is put over the fire and boiled rapidly till it is considered done, when it should have been subjected to only very moderate heat, and the water, instead of boiling madly, should have merely simmered, because the first process makes it tough and stringy, while the second leaves it tender and palatable. Joints of fresh meat require from twenty to twenty-five minutes per pound. Salted meat should have nearly twice as long cooking or it will not be tender. Judgment must be used regarding the size and shape. A large, flat piece of beef, having more surface exposed to the heat, will take less time to cook than a leg of mutton of the same size.

There is a belief among housekeepers that, in boiling, meat loses much of its value. On the contrary, careful experiment shows that a sirloin of beef, weighing twelve pounds, lost in roasting forty-four ounces, while twelve pounds of beef lost only twenty-five ounces in boiling. The loss sustained in boiling, being capable of use as soup, can hardly be called a loss. It is therefore proved without argument that boiling is the more economical. But it can not be denied that the flavor of roast meat is far superior. To be perfect it should be roasted before an open fire with frequent basting and turning, but such cooking borders on the impossible and we have a good resource in careful baking. The oven should be very hot and the beef put in without water in the pan. In ten or fifteen minutes the heat will have slightly crusted the beef, which should then be basted with clear drippings every ten minutes. The object of thus quickly searing the beef is to prevent the escape of the juices. If nine minutes to the pound be allowed, the result will be a very good imitation of juicy, rare, real roasted beef.

Broiling is one of the simplest and most wholesome methods of cooking meat, but it requires care. The want of constant watchfulness ruins steak, fish, or whatever is on the broiler.

Frying is a method worthy of more respect than public opinion grants it. It is the abuse of the practice which has brought it into disgrace. Throwing a lump of cold fat upon a cold frying pan and putting the meat on that, the careless cook leaves it to work out its own destruction, which it surely does, for as the meat and fat heat together the former is thoroughly soaked by the latter and becomes sodden, unsavory, and unwholesome. Frying as it should be is actually boiling in fat, and it is impossible to fry properly without a large quantity of fat, be it lard or drippings, and it should be very hot before anything is put into it. To test the temperature a bit of bread should be thrown in. If it crisps instantly the heat is right, but if the bread scorches, the fat is too hot and the pan must be lifted to a cooler place. If the bread does not brown the fat is not hot enough. There is no extravagance in using a large quantity of fat, for it can be poured into a bowl and used again and again. Clarify it, when necessary, by boiling it up in water, then let it cool, when the sediment will fall to the bottom of the water and the fat rise on top. If in boiling and roasting meats every scrap of dripping that runs out is saved, the accumulation will, in most families, afford abundant supply for frying in the manner described.

Poultry should be put into the pot breast downward, with warm, not hot, water enough to cover, and be brought very gradually to the boiling point, and then allowed to simmer steadily till a trial of their joints shows that they are done. No rule can be given for the time required, for young fowls will take less time than old ones.

Old Folks at Home.

NELLIE BURNS.

Old people have but little power for adapting themselves to strange places, strange people and strange ways. They have come to that time in life when a restful quietude of both mind and body is the one thing needful to their happiness. Such a condition can best be secured when there is a congeniality in the surroundings, and the senses are daily soothed by the sight of loved and familiar objects.

The ties that bind an old person to the home that has sheltered him for a quarter or half a century are almost as strong as life itself. Around him are the fruits of his own handiwork. He sits in the shade of trees planted by himself long, long ago. How interestedly he has watched their growth through all the long years! How he pruned and tended them during the first period of their existence! And, as their roots struck into deep soil and they grew into beautiful monuments of his industry, they formed one more endearing link to bind him to the old home. The fruit garden, yielding each year its luscious offering to the household comfort, is another silent object of attachment; and the flower beds with the old-fashioned perennials have been a source of such delight for so many long years that to the old people the bright hues and sweet odors of their favorite blossoms are like a delicious tonic. Inside the house each room has sacred memories. The old-fashioned parlor is consecrated, for both funerals and weddings have taken place within its four plain walls. Each piece of antiquated furniture has some little history of its own. Here and there over the house are relics of the first days of housekeeping, loved links that bind the present with the period of long ago.

To the old people these things are not mere inanimate objects to be carelessly cast aside; so deeply are they associated with their lives that they have become an important element in their existence. To be separated from all these familiar scenes, to enter upon an entirely new experience just at the time when the mental and physical forces are yielding to the strain of years, means a loss of happiness and a weakening of vitality.

A dear old lady of my acquaintance had lived for fifty years under one roof. Dear, indeed, to her were the old home and all its appointments. Her plain, old-fashioned ways were in perfect harmony with the plain old home. When the infirmities of age began to appear, her children, who were settled in homes of their own, strongly advised her to make her home with them,—staying with one and another as her fancy might dictate. The old home was rented and the aged mother commenced her new life. For a year she endured the martyrdom, for such it proved to be to her, when she again took possession of the old home. A portion of the house was let to a worthy couple, while the old lady took a homeless orphan girl to live with her and assist in her domestic labors. In telling me of her experience that year my old friend said: "I felt like an old weather-beaten craft tossed about in unknown

FIG. 1. ORNAMENTAL FRAME FOR MIRROR.

waters. I always had a feeling of strangeness about me; never knew any of the sweet, quiet happiness that I feel when in my dear old home surrounded by so much that is loved and familiar. When I returned home I felt that I had truly entered a haven of rest. And I never expect to have any other until I enter the one 'not made with hands.'"

Washstand Belongings.

CE DORA LIENELLEN.

Almost any home will furnish a large old-fashioned mirror, in a plain, wide, wooden frame. This can be converted, as follows, into a desirable, useful ornament for a pretty bedroom: Procure a few dozens of sycamore balls and a box of lichens; enough for an outside border of the hard, whitish ones, such as are commonly found growing about the base of old stumps, and enough of the greenish-gray scales from off old logs or decaying fence-rails to cover the remainder of the frame. Then get a pan of glue, and the work can begin. Glue an inside border around the glass of the sycamore balls, two rows of the white lichens in such a manner as to give a scalloped effect around the outer edge of the frame, and fill the space between with the greenish-gray ones. This makes a remarkably pretty frame, and one which is much more durable than the materials of its construction would lead one to suppose.

A splasher to accompany the mirror can be made by covering a whole sheet of pasteboard with the

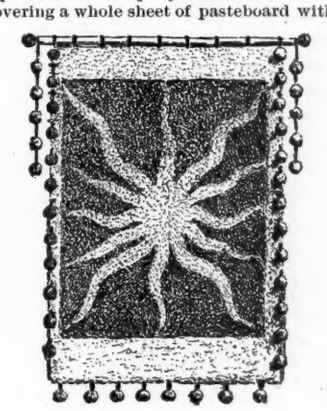


FIG. 2. SPLASHER FOR THE SAME.

same varieties, using the white for the outer edge and the green for the center, and finishing with a fringe of the sycamore balls, suspended at short intervals with bits of narrow ribbon. A bunch of half a dozen or more attached at each of the fastenings and allowed to dangle loosely, held by various colored narrow ribbons, six or seven inches long, completes the ornaments.

As a mat for the wash-bowl and pitcher, an old waiter lined with long, green moss, is very tasteful. A large, branching, many-pronged thorn, with its points thrust into sycamore balls, makes a unique receiver for hair-pins, combs, and tooth-brushes. Some coils of yellow willows make pretty rings through which to draw the towels. These ornaments are very nice in a room where the walls are covered with modest tinted paper, the furniture is in wood colors, and the hangings are white or light.

Nice Dishes Made From Tapioca.

CARRIE MAY ASHTON.

Tapioca Ice.—One cup of pearl tapioca soaked in cold water over night; in the morning boil in water in a double kettle until clear and soft; add one cup of white sugar and a little salt. Chop a ripe pineapple (after it is peeled) and put it in a deep dish and pour the tapioca over it boiling hot. Stir and pour it into a mold. When cold turn out and serve with cream and sugar.

Tapioca Cream.—Soak three tablespoons of pearl tapioca over night, add one quart of milk and cook in a double kettle until soft. Beat the yelks of three eggs with a scant cup of sugar and add these to the milk; flavor with vanilla. Beat the whites and add a spoon of sugar, and frost. Place in the oven a few minutes and brown slightly. Serve cold.

Tapioca Pudding, No. 1.—Eight tablespoons of tapioca soaked three hours (or over night) in cold water. In the morning add one quart of milk and five eggs well beaten (leaving out the whites of two). Bake in a moderate oven three-quarters of an hour. Beat the two whites and add three tablespoons of fine sugar, and frost. Set in the oven ten minutes to dry.

Tapioca Pudding, No. 2.—Soak three heaping tablespoons of pearl tapioca in cold milk one hour. Take one quart of milk, add one-quarter of a teaspoon of salt, place in a double kettle and let it come to a boil. Add the tapioca and cook three-quarters of an hour. Beat the yelks of four eggs and stir in the tapioca with one cup of sugar. Stir well and cook ten minutes longer; pour in a pudding dish and set away to cool. When partly cool add one teaspoon of vanilla. When cold and ready to use beat the whites of the four eggs to a stiff froth; whip half a pint of cream, add three tablespoons of fine sugar, and half a teaspoon of vanilla; mix all together and pour over the pudding. This pudding is just as good the next day, but it is better not to make the frosting until you are ready to use it.

Tapioca Fruit Pudding.—Soak half a cup of tapioca over night in nearly one quart of water. In the morning take a pint of pitted cherries (fresh or canned) and put in the bottom of a pudding dish, with two-thirds of a cup of sugar sprinkled over them. Put half a teaspoon of salt in the tapioca, pour over the fruit, and bake in a moderate oven one hour. Serve with cream and sugar.

Apple Tapioca.—Soak one cup of pearl tapioca one and a half hours in water to cover. Peel and slice sour, juicy apples in an earthen pudding dish. Stir half a cup of sugar and a little salt into the tapioca, and pour over the apples and bake one hour. Serve with cream and sugar. This is a most delicious dessert and much used for invalids.

A Housekeeper's Don'ts.

LAURA A. BEATTY.

Don't allow the broom to stand on the brush end when not in use; hang it on a nail by means of a ring in the top of the handle.

Don't forget that a broom will last much longer if, after using, it is dipped in boiling water for a few minutes.

Don't fill the best windows in the family living-room with plants.

Don't neglect to air the house thoroughly every morning. Open opposite doors and windows for five or ten minutes, even if it is stormy.

Don't undertake extra work to give pleasure when you know that you have neither time nor strength for it, and that, as a result, some one will be sure to be overtired and cross.

Don't forget, if you are a tall woman, to have your work-table and ironing-board a few inches

higher than they are usually made. This little precaution will prevent many a backache.

Don't neglect to have your name plainly painted on all jugs or bottles that are sent to the store for vinegar, molasses, etc. Then you will be sure to get back your own.

Don't think when you sit down to rest that it is necessary to pick up that unfinished mending. Ten minutes' absolute rest is worth much to the tired muscles.

Don't allow soiled clothes to remain in the bedrooms. They taint the air and make it impure.

Don't keep for company the best room, the best dishes, and especially the pleasantest smile and most entertaining conversation.

Some Decorative Suggestions.

EVA M. NILES.

Bolton sheeting, a favorite material for decorative purposes, may be used in its unbleached state or in colors. Take it in its cream or unbleached shade; have a design of poppies broadly treated; carry out the flowers and leaves in the shades of red, green and silvery gray rope linen floss, which is large in size and goes on quickly in working. The old-fashioned chain-stitch is revived in all its beauty, but the most popular stitch is the common outline. The edges of the quilt having been previously hemmed, trim with the tassels which come already made from the rope linen floss.

Another good quilt material is the common blue denim, the kind of which mens' overalls are made. Wash and boil the material. When it is partly dry press smoothly, have an all-over design stamped on it and work it with white rope linen floss. Finish the quilt as directed above. Sofa cushions and table covers are pretty made of these materials.

Another style of quilt is to crochet broad stripes of some design (the antique lace pattern is very pretty); then sew them together and trim the quilt all around with a border of the same design. When this is placed over a colored silesia spread the effect is very pretty.

Piano covers are also made of Bolton sheeting, which has a heavy body and a soft surface, rendering it suitable for the purpose. On a width of dull blue may be applied a broad band of deep, cream-tinted velvet, couched to the sheeting by a heavy blue cord. A pomegranate conventional design is shown on the soft surface, done in heavy blue and red rope linen floss, couched down with a finer grade of old gold fine Scotch linen floss used double. The finish of the scarf is composed of a heavy fringe of the blue rope linen floss, with gilt tassels caught here and there. This rope linen floss may now be bought by the yard all ready for use. Couching is gaining favor. Many of the odd "fads," such as scrolls and wheels, bars and cross lines, are really but a revival of the embroideries exhibited over a century ago.

For a table scarf an all-over design of boldly outlined clematis is embroidered on cream-tinted linen, worked in dark blue linen flosses, the foliage outlined or partially filled in with soft, olive greens. A deep, raveled fringe with a knotted heading is the finish. Pale silk pongee of a cream or olive shade embroidered with the linen flosses makes a pretty scarf.

Head-rests are comfortable and pretty. Get a pad such as comes already made to put under stair carpets, one of the narrow kind. Cut it in halves. Cover each half with china silk. Join by ribbon bows and throw on a chair, saddle-bag style. For common use the gayly figured cretonne is very nice; if a plain color is wanted use sateen.

A novel arrangement for palm-leaf screens is to cover half the leaf diagonally with a piece of lincrusta-walton, letting it fit in half the circle and slant across the handle. Decorate this in either of the two following ways: Paint flat on the lincrusta some twigs and boughs with a few berries, all half-covered with snow, slightly clouding the background to represent a winter sky; a distant bird painted flying adds to the effect. Paint the remaining half of the leaf cream color, with gold clouds, and fasten firmly half over the edge of the screen a stuffed bird (a robin or any common kind) with wings outspread, as if flying down to the berries. A second design is to place a piece of electric blue satin in the same way as the lincrusta on the first screen; get some real hawthorne twigs and gild them; then paint some twigs lightly on the satin, just tipping them with gold and design a spider's web in silver attached to the twigs. Place a real Japanese spider in the web and a fly caught in the meshes. Color the lower half of the fan a darker shade of electric blue and lay the real gilded branch half over, painting one or two of the silver strands of the web to meet the twigs as if attached, and fleck the surface lightly with gold clouds. Wind the handles with ribbon tied in a large bow.

Culinary Wisdom.

Mutton Curry.—Cut half a pound of cold boiled or roast mutton into neat squares; chop and fry an onion; add the meat; toss it about for a few minutes; strew over half a teaspoonful of curry, and add broth, made from the bones, enough to cover the meat. As soon as it simmers stir in a teaspoonful of flour, wet with cold water, and pour in the center of a border of nicely-steamed rice. This is a good way of using the "everlasting cold mutton."

Vegetable Stew.—This is a treat to lovers of vegetables. Slice thinly one cold boiled carrot, one turnip, two potatoes, one onion; add three ears of corn cut from the cob, one cup each of Lima beans, string beans and peas, all cooked; one quarter of a pound of salt pork, finely chopped, and one sliced tomato; cover with equal quantities of broth and milk, and stew twenty minutes. Thicken with butter and flour and season with salt and pepper.

Sponge Trifle.—Put into a glass dish six three-inch squares of sponge cake previously cut in half and spread with preserves or marmalade put together again, and stuck over the top with a few blanched almonds. Soak them for half an hour in two wine glasses of sherry, unless your principles forbid, when milk flavored with vanilla will prove a good substitute. Beat the yelks of six fresh eggs thoroughly with two tablespoonfuls of white sugar, and add three cups of boiling milk, pouring it over slowly and beating the while. Flavor to taste. Pour into a small saucepan and set within another of boiling water, stirring constantly and always one way until it becomes of the consistency of triple cream. Let it partially cool and pour over the sponge cake.

Real Southern Gumbo.—Joint an old chicken; reserve the breast and put the rest into a large saucepan with four quarts of water. Add two ounces of thinly sliced bacon, a pint bowl of thinly sliced potatoes, one pint of tomatoes peeled and sliced, and one pint of okra likewise sliced; two onions cut small, salt, and a pod of red pepper broken small. Simmer for four or five hours. Meanwhile, break the bones of the breast, cut into fillets and fry. Add this to the soup and simmer another hour. Then add half a pint of corn, and if they are in season the same quantity of young, tender Lima beans. Just before sending to the table, thicken this soup with a tablespoon of flour browned with the same quantity of brown sugar. Keep the quantity the same as at first by replenishing the saucepan from a kettle of boiling water. Some add a slice or two of lemon to the tureen. This soup is better the second day than the first.

Codfish, Shaker Style.—Buy one pound of salt codfish, choosing a thick, middle cut; tear it in pieces, cover with cold water, and place where the water will heat slowly. If the water tastes too salt pour it off and add fresh hot (not boiling) water, letting it stand for another while, without allowing the water to come to a boil, which toughens it. Drain, turn into an earthen bowl and pick into flakes, taking out the bones with great care. Put a piece of butter the size of an egg into a saucepan, and, when it is melted, add a large tablespoonful of flour; stir until smooth; add a cup of boiling milk, the codfish, and seasoning to taste. Now stir in one gill of hot cream, and pour into a buttered pie-dish. Drop one egg for each person on top, dust with salt and pepper and place in a hot oven until the eggs are set. This quantity of fish will be enough for eight persons and requires eight eggs.

Venison Pasty.—Many of the readers of the AMERICAN AGRICULTURIST can have this game for the shooting, and will enjoy a venison pie made as follows: The neck and shoulders are the best for the purpose. Cut enough of the meat into pieces an inch square to make a pie of the required size, and stew tender, simmering very slowly and adding a small minced onion, salt and pepper—the latter when the meat is nearly done. Meantime make a broth with all the trimmings and inferior portions, an onion, a few sprigs of sweet herbs, a blade of mace, and salt and pepper. Cook these until all the substance is extracted; strain, and skim off the fat. Return to the fire, thicken with browned flour, and finish the seasoning with the juice of half a lemon. Line a deep dish with good paste; put in the stewed venison; season each layer with butter, adding a little of the broth in which the meat was stewed. The meat must be just covered with this, and the rest, if any, added to the gravy made by stewing the trimmings. Cover with a lid of paste, cut a circular hole, and bake two hours, covering with stout paper, to keep the crust from scorching. Just before it is done remove from the oven, and, with a small funnel, pour as much gravy in the hole in the top as the pie will hold.

Household Brevities.

KATHERINE B. JOHNSON.

Boil clothespins in clean water once a month, and they will be much more durable.

Open canned fruit an hour or two before it is needed for use. It is far richer when the oxygen is thus restored to it.

Save the small paper bags carefully which groceries come in; they are useful in many ways. Slip the hand in one when you black the stove, and you will not soil it. When flies abound, slip them over the clean lamp-chimneys during the day. After fruit is canned draw them over the can, and label them plainly; the action of the light causes more fruit to spoil than any other one thing.

Beat an egg thoroughly in a bowl and add one teacup of cold water to it. Use enough of this to thoroughly moisten coffee when making it. Keep in a cold place, and waste no more eggs by drying.

Granulated sugar is the purest brand; consequently the cheapest. Do not use quite as much as of other kinds—one-half inch less for a cupful. Cake batter made with granulated sugar requires longer beating than usual, as the sugar is longer in dissolving.

To beat the white of eggs stiff, with ease, they should be cold, with a very small pinch of salt added.

Egg-shells are somewhat porous, and like butter and cheese absorb unpleasant odors. Therefore, eggs should be kept in a sweet, clean, cool place.

All floor and whisk brooms should be thoroughly wet in scalding hot brine before using them. It will effectually prevent the straws from breaking.

Add two tablespoonfuls of kerosene to the pail of water with which you wash grained or other varnished furniture.

Cut a piece from the top of old kid shoes and insert it inside the ironing-holder you are going to make.

Make boiled starch with a weak soap-suds made of white soap, instead of with clear water, and you will have no difficulty with its sticking.

Do not wring woolen underwear through a wringer. Use the hands and shake it thoroughly before drying. When perfectly dry fold it smoothly, but do not iron. See if the odor is not more agreeable than when a hot sad-iron has passed over them.

Never slice apples for making pies; quarter and core, and if an apple is large cut each quarter in two pieces.

Sift a tablespoonful of pulverized sugar over the top of two-crust pies *before* baking, and see how delicious it makes them.

Never put tea leaves on a light colored carpet; they will surely leave a stain.

After thoroughly sweeping a dingy carpet, wipe it with a damp cloth partially wrung out of a mixture of water and ox-gall in the proportion of two tablespoonfuls of the latter to a gallon of lukewarm water.

In packing bottles or canned fruit for moving, slip a rubber band over the body of them.

A small teaspoonful of powdered borax added to a bowl of cold starch will give more stiffness to linen than any of the numerous things I have tried.

When you are hurried and a postage stamp will not stick, moisten it and rub it on the flap of an envelope, and then quickly put it in its place.

Mix stove blacking with spirits of turpentine. It will take off the rust, polish easier, and stay glossy longer than when water is used.

Add a tablespoonful of borax to a pan of hot soap-suds; put your table silver in it, and let it stand two hours. Rinse it with clear water, and polish with a soft cloth or chamois.

Warm dishes for the table by immersing them in hot water, not by standing them on a hot stove.

Coffee boiled longer than one minute is coffee spoiled.

BOYS & GIRLS

"The Fourth" at Montrose Towers.

AGNES CARR SAGE.

Never, in all his fourteen years, had Channing Schuyler been so enthusiastic an American as when he found himself in England, a pupil at an English school, and surrounded by English boys who cared not a rap for the Declaration of Independence. He waved the star-spangled banner (metaphorically, at least) and vaunted the merits of base ball over cricket until some of the "grave and reverend seniors" threatened to "throttle the little Yankee, and duck him in the Thames, if he did not shut up about his old country."

"Guess they wouldn't try it more than once," piped Chan, like a spunky bantam. "I was named for a signer of the Declaration and am as independent as he was."

There was one, however, among the merry little "John Bulls" who possessed a deep and fervent admiration for the wide-awake young American who was as lavish with his pocket-money as with his patriotism, and as quick-witted at his studies as on the playground, and that one was the shabbiest dressed, best-hearted, most thoughtful boy in the whole school. His name was St. John Ferris, and he often questioned Chan about the United States and seemed to look upon it as the "land of promise," for, although a young Squire in his own right and belonging to a county family that could trace itself back to William the Conqueror, yet he was land-poor, being forbidden by law and the wills of his forefathers to sell a foot of his many "dirty acres," and had few shillings to jingle in his patched and worn pockets.

"I mean to go to America some day," he remarked one lovely May afternoon, as he and Channing were rowing together on the river. "My father was on his way there, in a sailing essel when he was drowned."

"It is a good place for a smart fellow to make a fortune, particularly in the West," said Chan, resting on his oars and whirling round in his seat that he might face his companion.

"That is what I want to do," continued St. John in his soft, well-modulated, English voice, "or, at least, enough to clear off the mortgage on my estate. As it is, Montrose Towers are but a weight around my neck."

"How did it happen, Ferris?" asked Chan. "Has your family always been straitened, or did your ancestors squander their substance in riotous living?"

"Neither. Indeed, it was just the other way. They were too saving; at least, my grandfather was, for he was a—a—regular miser," and a flush crept up over the lad's cheek as he uttered the detested word. "He screwed and scrimped himself and his only son down to the lowest notch, sold almost all the timber on the place, and even went so far as to mortgage the land, hoarding all the gold thus acquired up in bags, which he hid away in secret places. Oh! I can't tell you what a life he led my poor father and mother, who were as open-handed as he was close, until at last my father rebelled, left home and sailed for America, hoping soon to be able to send for Mamma and me. But he never saw the new world; for the ship went down in mid-ocean with nearly all on board, and he was lost among the rest."

"By Jove, St. Jack! That was rough!" exclaimed Chan with true boyish sympathy, and using his pet nickname for his friend. "Then what did you do?"

"O, Mother and I lived on or rather existed at the Towers and Grandpa tried to make me as saving as himself. But he couldn't do it. Economy is one thing and stinginess another; but I would rather be a spendthrift than starve body and soul as he did. Well, it was horrid, but we comforted ourselves with thinking that there would be plenty of money some day, and I could make my dear old home what it ought to be and what it once was, but no, when the old man died, we were disappointed again. There were scarcely a thousand pounds in the bank and nowhere could we find a penny of the wealth we were certain he had been secreting all those years. He had hidden it all too securely (for he had a sad dread of thieves), and, dying suddenly, never revealed the spot to any one."

"But did you search well?"

"Search! I should think we did. The whole house was turned topsy-turvy for weeks, and the grounds were dug up from end to end. It was all of no use, and Mother and I had just to make the best of the ramshackle old place, and shift and contrive to keep the roof over our heads and give me an education;" and St. John laughed a bitter little laugh, sad to hear in one so young.

"How awfully queer! It sounds like a story book."

"Doesn't it? Although I don't look much like a hero and certainly don't enjoy being the victim. Still, Montrose Towers is a pretty, picturesque spot even if it is tumble-down, and I love it dearly."

"I should like to see it," said Chan.

"Would you? Do you really mean it?" asked St. John, eagerly. "I should be so pleased to show it to you. Would you like it well enough to spend part of the long vacation with me? Mother would be charmed. There is first-rate fishing close by and we could have the jolliest rides over the moors. It would not be very dull."

"I am sure it would not, and I should enjoy it above all things. Only, you see, father has planned for me to join him and my sister in Switzerland as soon as school closes."

"O, write and ask him if the middle of July will not do as well, and then, if he consents, come home with me for a month."

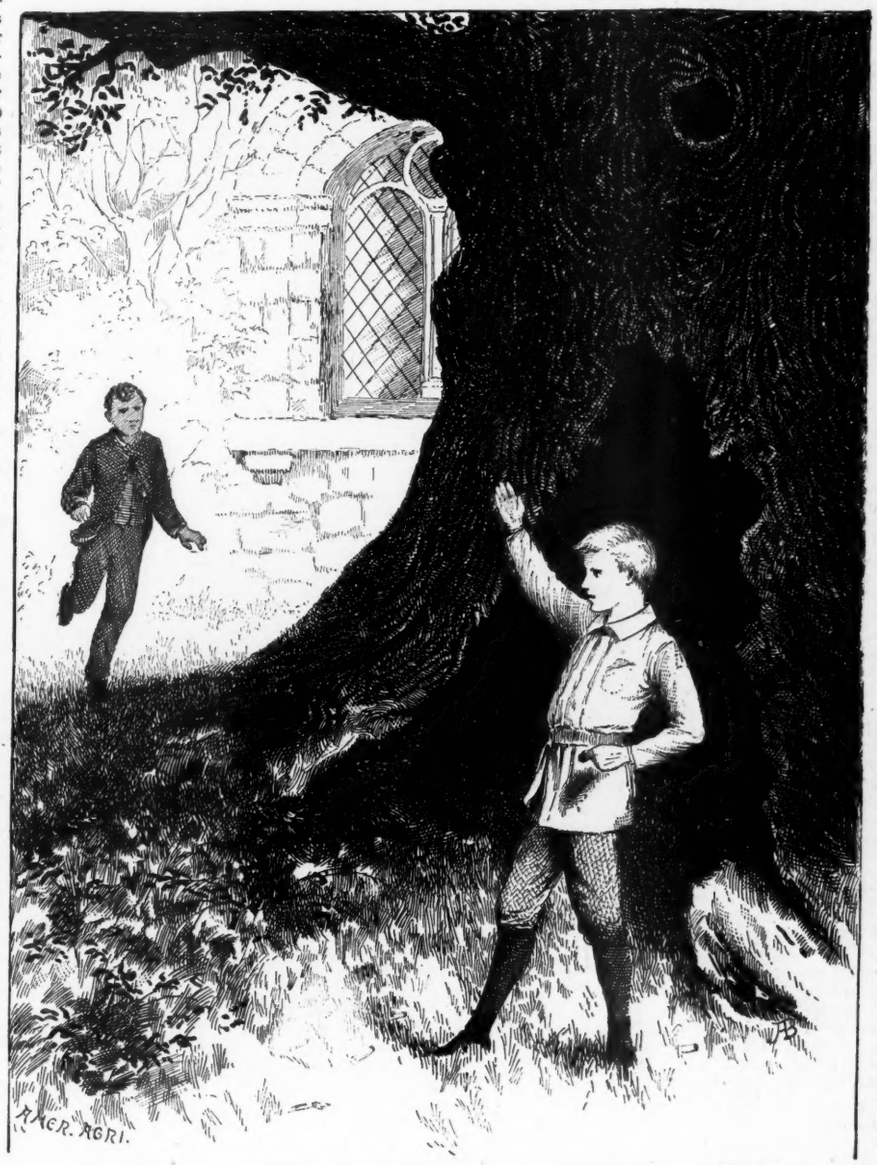
"All right, St. Jack! I will."

So it was settled, and that very evening a persuasive letter went flying off by the night mail, to "Gilbert Schuyler, Esq." at Paris. The answer was satisfactory, and one sweet, dewy gloaming in "jocund June" found the two boy friends driving up the grass-grown roadway that led from an uninhabited lodge to the old, ivy-clad stone mansion known as Montrose Towers.

"Why, Ferris, it is stunning!" exclaimed Chan, standing up in the trap and gazing around upon the luxuriant tangle of vines, weeds, and roses that overran everything, and the dark, many turreted house, hung with Nature's foliage drapery, and guarded over by two gigantic trees that looked as though they had stood sentinel for centuries. "What glorious oaks!"

"Yes, those are Gog and Magog," laughed St John. "They are old veterans, and hollow at the heart, but are likely to last for generations yet. Oak trees are hard to kill, and grandfather would never have them touched, even when he sacrificed much finer timber to his ruling passion. But see! There is Mother in the doorway!"

Channing was captivated at once by the gentle, sad-eyed lady, who welcomed him almost as warmly as she did her son; and he did full justice to the substantial little supper laid for them in the great, wainscoted dining-room, while he felt as though wandering in a romance when the



"HAVE YOU FOUND ANYTHING WORTH WHILE?"

queerest of old serving-men, in a rusty livery, with a face like a withered apple, and a scornful contempt for the letter h, appeared and conducted him up a winding staircase to a deliciously quaint apartment, hung with faded tapestry, and containing a curtained bed so high that it required three steps to mount into it.

"Well, this is a novel experience," he thought, as he blew out the candle and sought the drowsy god between the lavender-scented sheets, "and, I'm mighty glad I accepted St. John's invitation. But I hope the ghost of that miserly crank won't take it into his noddle to pay me a visit."

His slumbers, however, were haunted by nothing worse than a few fantastic dreams and he was awakened, next morning, by old Magog's branches tapping a *reveille* upon his window pane. Then he sprang up to begin the first of a whole month of happy, rollicking days, when one country pleasure after another makes the variable whirligig of Time spin like a very gay and fast teetotum. He soon understood his friend's affection for the dilapidated home of his forefathers, but he could not help observing how pinched the small family was in many ways, although Mrs. Ferris was very clever in covering up her little economies, and her devoted retainer, old Plushkin, endeavored to compress a whole retinue of servants into his faithful antique self, by assuming the varied roles of waiter, butler, footman, and coachman with an air and dignity that could not but provoke a smile.

"I could hardly keep house without my gruff, trusty Plushkin," the hostess often said, "and he, I know, would lay down his life to please me."

So it was this factotum of all work, who on the second of July came in, tottering beneath the weight of a wooden box, and announced, "Something for Master Schuyler. It were fetched by express. Charges paid. Marked, 'hopen with care!'"

"What in the world can it be!" wondered Channing, as he and St. John jumped up and began examining the case on all sides.

"S'pose you knock off the cover and see," suggested Plushkin tersely.

"Good advice, old chappie," laughed Chan, and, having done so, both lads were in ecstasies to discover that the box contained a truly fine assortment of pyrotechnics, including everything from the small and frisky Chinese cracker to the latest improvements in wheels and Roman candles, besides a miniature cannon and goodly supply of gunpowder.

"Father doesn't intend that I shall forget our national holiday, if I am in a foreign land," chuckled Chan. "And O, St. Jack, we will have an out-and-out American 'Fourth,' pop and bang away all day, and invite your neighbors to a display of fireworks in the evening. What do you say?"

Young Ferris fairly radiated with delight. "Yes, of course," he shouted, for he cared not a whit why the day was celebrated and only thought of the fun.

Mrs. Ferris, however, did not look so enraptured. "My dear boys!" she exclaimed, "Do be careful and not put your eyes out or blow off any of your fingers! I have a horror of gunpowder, and must ask you to store your combustibles somewhere out of the house or I shall not sleep a wink, to-night." As the boys bore away their treasures she remarked to Plushkin, "O dear! Why did Mr. Schuyler send these dangerous things! I shall not know a moment's peace until they are burned up, and, were it not for the disappointment to St. John and his friend, could almost wish an accident would destroy them before day after to-morrow. However, that is not likely to happen."

"No, my lady," replied Plushkin demurely.

Just then St. John dashed in to say, "We have packed all the fireworks away in old Magog, Mamma, for though hollow nearly to the top the trunk is half a foot thick and they will be quite safe there from rain and everything else."

"Mebbe they will and mebbe they won't, my young master," muttered Plushkin as he trotted off. "The mistress am the one to be considered in this 'ouse, and why should Yankees be a-celebrating of their 'olidays and victories on English ground? I don't want it. My lady don't want it, and if Plushkin likes to smoke 'is morning pipe in the 'eart of the old oak tree who is to 'inder? And if 'e be so unfortunate as to drop a spark, it will be an accident, only an accident! He! he!" and the old man chuckled gleefully.

In gladsome anticipations, the two boys spent the next thirty-six hours, and retired in good season on the eve of the eventful day. Therefore, St. John was not surprised on the morning of the Fourth when he heard Channing up bright and early, dancing a clog on the floor above, and lustily singing "Yankee Doodle," and "The Red, White and Blue."

"Three cheers for the red, white, and blue!
Three cheers for the red, white, and blue!
The glory and boast of our banner,
Three cheers for the red, white——"

But there he came to an abrupt pause, or rather merged the melody into a cry of startled dismay, as from beneath his window sounded a deafening report, and he rushed to the casement to behold old Magog spitting forth fire like a volcano, with rockets whizzing in wild confusion, pin-wheels whirling, blue lights burning, snakes zig-zagging, and crackers snapping; while within the giant oak such mysterious rumblings and explosions were heard that the kitchen-maid hid in the cellar half-mad with terror, and Mrs. Ferris came so near to fainting that St. John had to run for camphor, and had little time to bewail his lost sport. Indeed, it was not until the fireworks had expended themselves and the excitement had somewhat subsided that the boys had an opportunity to give vent to their sorrow and disappointment, in which the pale hostess sympathized truly, in spite of her relief, and the sly old Plushkin most hypocritically, often turning aside to hide a triumphant smile.

"I can not understand what set them off," exclaimed St. John, for perhaps the twentieth time, as they rose from breakfast.

"Nor I," said Channing. "But the old tree seems to have stood the shock bravely, and now

SLY OLD PLUSHKIN.

that the powder has had time to cool let us go and poke in the *debris*. Perhaps we can find a squib at least with which to salute the day."

"Put on your heavy boots first, my son," said Mrs. Ferris, "Some of the ashes may be hot yet."

So, as St. John went to obey, it was the little American lad who was earliest at the black, charred, but still sturdy oak, and was investigating the pyrotechnical ruins. Suddenly, he picked something from the embers and turned it over and over in his hand, looked closer and then, starting up with a white, half-frightened face, shouted excitedly, "Ferris, O, Ferris!"

"What is it?" asked St. John, running down the steps. "Have you found anything worth while?"

"Well, I reckon I have," and Chan held out three round, smoky objects on his dirty little palm.

"Sovereigns, as I'm a Briton! Where did they come from?"

"From old Magog! O, St. Jack, do you think that could have been the miser's money-vault?"

Suppressed emotion sank Chan's voice to a whisper and the two lads gazed at each other in awed silence. Then with one accord both set off on a brisk scamper for the guardian oak and, in five minutes, had "made assurance doubly sure" by finding hundreds of coins mingled with the chips, ashes and gunpowder, and also a scrap of burned canvas, showing conclusively that the blazing crackers, wheels, and candles must have set fire to a strong bag, hung by old Squire Ferris far up in the Egyptian darkness of the venerable hollow tree, and forced it to let down its golden treasure.

What a day of wonders that fair Fourth of July proved! For on investigating old Gog also, more hidden wealth was discovered, placed so high that it required a ladder to reach it, while a new light dawned in Mrs. Ferris's sweet face; and the sun in the summer sky shone no more brightly than did the star of hope before the mental vision of the boy-squire who had come into his rightful inheritance at last.

But Plushkin, sly old Plushkin, was perhaps the proudest man that trod shoe-leather that morning, and he could not resist making a clean breast of it, and confessing how "To please 'is deary, deary lady, 'e 'ad smoked 's pipe in the 'eart of old Magog."

"But I never dreamed of your doing such a thing!" cried Mrs. Ferris, shocked by this avowal.

"And it was a mean, shabby trick, too!" said St. John. "Nevertheless, as things have turned out we will forgive you, Plushkin, and thank heaven that dear Chan Schuyler and his fireworks came to bring good fortune to Montrose Towers."

"Then," cried the young American, "Let us give a hip-hip-hurrah, three cheers, and a tiger for the glorious Fourth!" and they were given with a fervor that frightened the rooks from the turrets, while Gog and Magog bent their stately heads and clapped their thousand leafy hands in mute applause.

Breaking the Colt to the Cars.

ALFRED H. PETERS.

One morning last spring a traveler approaching a country railway station noticed a man holding a young horse some twenty rods distant from the track upon which a train was then standing. The man's left hand grasped a strong leather halter at the point where it is fastened to the leading line, while his right hand held firm hold of a heavy strap buckled loosely about the horse's throat. The man, who was speaking to the horse in a low voice, presently began moving with him over the open space toward the locomotive which thus far was perfectly silent. The horse's open nostrils and erect ears showed him to be somewhat excited at the strange apparition, but he evidently felt assurance in his keeper, by whose side he had moved with short and nervous step over perhaps half the distance between himself and the train when the locomotive suddenly let off steam.

The terrified creature turned like a flash, and in so doing for an instant swung the man's feet clean off the ground. But before the horse made the first spring in the opposite direction the man's feet were again on solid earth and he lost hold with neither hand, although the horse dragged him beyond the place of starting before he could be stopped. Casting his eyes around at the still hissing locomotive the horse again sprung forward, but could no more free himself from the man's hold than a rat could escape from the teeth of a terrier. After a few more futile attempts the horse again turned around, and this time found himself able to endure the sight of the locomotive. Thus he stood for perhaps two minutes with staring eyes and quivering muscles. After a little the steam was shut off, when the man loosed his hand from the strap around the horse's throat, and with it began stroking his neck, still speaking to him in the same low-toned voice.

Soon the horse became quite composed, whereupon the man, again grasping the throat strap with his right hand, urged him toward the train as before. With many stops and snorts of inquiry the horse permitted himself to be led again toward the locomotive, which, when he was about the same distance from it as the other time, burst forth into a second hissing, quite as loud as was the first. Again was repeated the scene already described, but the horse did not drag the man so far as before, nor did he require so long a time in which to be quieted. The steam soon shut off again and the man and horse once more approached the train, which now moved away from the station. The last glimpse of them showed the horse watching the now accustomed terror and the man by his side still grasping the head of the leading line and stroking the horse's neck—a beautiful and expressive illustration of the power over an intelligent animal of man's courage, kindness and patience.

A Farm That Ran Away.

About the last thing in the world that one would expect to lose by its running away would be a farm. Yet in Holland there has certainly been one case (and there may have been many more) where a farm literally ran away from its owner and was tugged home by canal boats! As every one knows, the whole land of Holland lies lower than the ocean, and is only protected by the immense dikes which are a wonder of the world; also by great pumps, moved by steam or by wind,

which pump up the water which steals in under the dikes and return it to the sea through the many canals. In the case referred to, where a canal had been dug, the water slipped in silently behind its protecting dike, or worked away under the surface of a large farm, and undermined it, while the farmer was thinking of no danger, until one day a great storm arose, and behold, the water had separated this farm from the rest of the land, and the poor farmer had the grief to see his own beautiful farm hurrying away as fast as it could go to join itself to another man's farm on the opposite side of the stream! But after the storm it was surrounded by canal boats and brought back, where by means well known to the Dutch it was safely anchored in its own old place.

The Screech Owl.

ERNEST E. THOMPSON.

On my table before me as I write is a beautiful specimen of this pretty little owl (*Megascops asio*). The illustration gives a good idea of its shape and markings. It is scarcely larger than a robin, as it is only ten inches in total length. Its general color is grayish washed with brown, or else bright reddish all over. These two colors bear no relation to age, sex or season, but different individuals happen so, just as so me cats are black and some are gray. I do not know why this bird should be called a screech owl, for all of its notes that I ever heard were soft and musical. The name of cat-owl is much more appropriate, as will be seen from its habits as well as from its appearance.

Some years ago the Legislature of Pennsylvania, acting under the mistaken notion that owls and hawks were wholly mischievous, passed a scalp act, by which a bounty was paid for each hawk and owl destroyed. But before long it was found that the whole scheme was a bad mistake; the hawks and owls are really friends of the farmer, as the naturalists appointed by the State to investigate found out. The result was that the act was repealed, and after the investigation had been still further carried on by the government at Washington and the results offered to the public, many of the States passed laws for the protection of hawks and owls, and these laws are still in operation. Among the birds which came up for trial before the tribunal of the United States Department of Agriculture was of course our little friend, the screech owl. It is not necessary to give in full the evidence that was taken, but it was briefly as follows: Ninety-four screech owls were shot in various parts of the Union (a rather destructive method of taking evidence, but justifiable under the circumstances), and their stomachs were then sent to Washington where they were examined by the government experts of the Department of Agriculture. Of this ninety-four, one killed at Portland, Conn., on the 23d of December, had in it a part of a pigeon. The season of the year goes to show that it must have been pressed for food or it would not have given grounds for this damaging record; however, it was the only one of the kind in the lot. Twenty contained remains of small birds, including sparrows, and in two cases the remains of another screech owl, showing probably that the scarcity of food had reduced the birds to "cannibalism"; these were taken at Washington, D. C., in January. Forty-one contained mice—the ordinary house mice as well as the destructive field mice that girdle so many young trees. One contained a frog; thirty-five contained insects, chiefly grasshoppers; three contained crawfish; one a spider; one indeterminate matter, and seven were empty. What wonder that an honest tribunal should not only acquit, but highly commend the little owl in the face of such a mass of favorable evidence?

This owl lives in the wooded parts of the States, and is also fond of frequenting old orchards, where its presence is encouraged by many intelligent nurserymen who are aware of its mouse-destroying propensities. Their plan is, first, to save it from molestation; next, to provide it with suitable accommodation in the shape of boxes with a large entrance hole, for, like most owls, it is fond of a hollow tree or any similar retreat for passing the day, as well as for the purposes of nidification.

THE SO-CALLED SCREECH-OWL.

More Prizes for Puzzle-Solvers.

For the four best lists of answers to the puzzles published below, we offer four attractive prizes, all of which will be delivered free to those who win them.

For the best list, "The Family Tool Chest," containing twenty cast-steel tools and twelve assorted sizes of brad-awls, with rosewood tool-handle holder, the whole neatly packed in a durable box. This prize will be found useful in every family. If you were to buy it, it would cost you four dollars.

For the second best list, twelve popular American novels, averaging over 300 pages each; regular price for the twelve, $2.50. These stories are from the pens of Julian Hawthorne, Amanda M. Douglas, and other well-known writers.

For the third best list, "Moore's Universal Assistant," containing 1016 pages, 500 illustrations, and a million facts, recipes, calculations, etc.—a perfect mine of information. The purchase price of this book is two dollars.

For the fourth best list, a handsome photograph album, with places for thirty-eight pictures. This prize would cost, if purchased, $1.50.

Answers must be mailed on or before the 20th of this month, to "Puzzle Editor AMERICAN AGRICULTURIST, 52-54 Lafayette Place, New York."

Please read this: We do not promise a prize to every puzzle-solver, nor have we ever done so. We do not answer letters by mail with regard to puzzles, as this would be giving some an advantage over others. There are no "rules" governing the puzzle contests except the one requiring answers to be mailed on or before the 20th of the month.

53. ALPHABETICAL PUZZLES.

1. What letter turns an animal into a covering?
2. What letter changes a fray into a bird?
3. What letter makes a fish stagger?
4. What letter covers a fruit with spots?
5. What letter makes light somber?

54. ENGLISH POETS.

1. A merry old soul and the top of a mountain.
2. The home of thousands and two-thirds of a priceless organ.
3. What the Thames never was and a robber's abode.
4. The ornament of summer and part of a landscape.
5. A wild apple and an auxiliary verb.

55. ANAGRAM.

Even a comb sits. (The answer is one word.)

56. DROP-LETTER PUZZLE.

—n—e—e—s—r—. (The answer is one word.)

57. RIDDLE.

Many a man of learning and skill
Has studied and puzzled his brain
To discover my methods and processes—still
He has studied and puzzled in vain.
I pervade everything that has life here below—
Whether plant, tree, fish, brute, or men;
Commencing at birth, all through life I go
Without once revealing my plan.
I never am heard, felt, smelt, or seen,
Yet all men witness my work;
As abundant effects show wherever I've been,
And my mission I ne'er like to shirk.
A few, it is true, have discovered, they say,
My secrets, and essays have wrote
To prove atoms, mixed in some special way,
Will produce what nature has wrought.
But *how* to combine these—quantities, kind—
They're as far from solution as ever;
So I leave it with you, dear reader, to find
What I am—as you can, if you're clever.
I don't mean the how or the processes find,
But simply my name, as 'tis known to mankind.

58. DROP-LETTER PUZZLE.

—a—i—u—i—a—i—n. (The answer is one word.)

ANSWERS TO THE MAY PUZZLES.

37. Divisibility.
38. Congregation.
39.
M E R I T
E R O D E
R O W E N
I D E A S
T E N S E

40. D-in, D-aunt, D-ash, D-art, S-mart, R-an.
41. W-ear, A-mend, S-tray, H-ire, I-deal, N-aught, G-age, T-race, O-rally, N-ever.
42. 205,888,223.

WINNERS OF THE MAY PRIZES.

The first prize, for the best list of answers, goes to Lucy Way, Shreve, Wayne Co., Ohio; the second to Nellie A. Woodward, Chapin, Morgan Co., Ill.; the third to Henry G. Tyler, Daysville, Oswego Co., N. Y.; the fourth to E. Steeper, 1214 Snyder avenue, Philadelphia, Penn.

WHAT SOME OF THE PUZZLE-SOLVERS SAY.

DEAR PUZZLE EDITOR: I wonder if you get up the puzzles all alone. If you do I am sorry for you. I have eaten and slept little since the May number came, and the last puzzle I solved in the middle of last night, "in my head," and, to make sure of it, got up to set it down.

J. M. TAFT, Chittenden Co., Vt.

How one of the contestants solved No. 42:

If L be eight and Z be nine
(To work that out cost me much time),
Then nine times seven is sixty-three,
And that revealed the three to me.
Then three times seven is twenty-one,
And thus the task was nearly done.
When multiplied and added, too,
This puzzling sum will show to you
That figures, like the letters, fall
In perfect line—and show to all
The two, naught, five and eight, eight, eight,
And two, two, three, as sure as fate.

A. T. SPALDING, Galveston Co., Texas.

Much to my surprise and delight, I received from you, the 1st of the month, a complete set of Shakespeare's works, as a prize for answers to puzzles in the February number. It was what I had long desired to own. Please accept my thanks. An invalid, confined to the house for several months, it has been a new source of pleasure this year to try to solve the puzzles as they appear from month to month in the AMERICAN AGRICULTURIST. The paper is a favorite with us, and its advent is eagerly awaited by each member of the family. Long may it prosper.

BELLE J. CLARKE, Worcester Co., Mass.

FROM NEAR AND FAR.

Improvements in Australia.

Cumberland is one of the eastern counties of New South Wales. The city of Sidney is the county seat. The surface is greatly varied from the low lands of the coast to the broken and mountainous regions farther west. The soil is largely volcanic, in such an incomplete state of disintegration as to give the county the reputation of being very poor for agricultural purposes. There are many beautiful country seats, belonging to wealthy citizens of Sidney, but it was not until recently that the agricultural resources of the county have been developed in an economic and self-sustaining manner. Lying in the western section of the county is Mulgoa, watered by Mulgoa creek and the Nipean river, and having a surface composed in part of alluvial bottom and in still greater part of broken and elevated land. Some of these valleys have been partially worked for generations, while the greater part of the district remained covered with sparse growths of timber.

But a great change has come over a large part of the district, mainly through the energetic and intelligent efforts of Mr. A. W. Stephen, an eminent surveyor of Sidney. Some three or four years ago he purchased the estate called Littlefields, consisting of 1400 acres, divided it up into small farms, and set to work clearing off the scattered timber growth, and breaking up the soil. He has sold off about one-half the estate, there being now twenty-five families located on the soil. With the proceeds Mr. Stephen built a church, warehouses, and other accessories of civilized life, planted choice fruit trees and ornamentals. But the most important step was the establishment of a butter factory, with all the latest and most improved appliances. These include a steam engine, two centrifugal separators, improved churns, butter-workers, etc. The present output is 1200 pounds of choice butter per week, which finds ready sale in Sidney. The factory is wholly an individual enterprise, the cream with which it is supplied being purchased of the neighboring farmers.

Not far from Littlefields is the estate called Winbourne, owned by Hon. G. H. Cox. One thousand acres of this are irrigated by water pumped from the Nipean river into a reservoir 204 feet above low water. The steam pump has a capacity of raising 22,000 gallons of water an hour. From the reservoir is drawn water for irrigating the fields, orchards and garden, and also the house, outbuildings and grounds of the estate.

The example of such enterprises as these is infectious, and the hitherto neglected places of county Cumberland will in a few years be made to blossom as the rose.

W. C. MATCHEM, Sidney, N. S. W.

Southeastern Arizona.

The spring of 1890 opened by far the most hopeless for stockmen they have ever encountered here. The winter snows and rains were too light to bring abundance of grass, and, except in favored spots, many cattle were dead—not, as in Nevada, from deep snow, low temperature, and starvation combined, but solely from want of food. All large bodies of grass-land, overburdened with cattle or sheep, become subject alternately to severe droughts and floods. In one part of Sulphur Spring Valley there is an alkali flat which in rainy seasons is a lake. In line with it, above and below, water is found near the surface, and the belief is general that there is an underground stream flowing towards Mexico, and constituting the headwaters of one of her rivers. For several years past, I have noticed that more rain has fallen within a few miles of that watered belt, and also wherever concealed mountain streams came into the plain, than on its waterless parts—where wells 150 feet deep are dry. Along the margin of the alkali flat settlers find abundance of good water in shallow wells. There has been no attempt at utilizing this water for farming purposes, but it is so plentiful that the time may come when steam force-pumps will send it several miles through pipes to desirable soil. The valley land generally will, under irrigation, grow ordinary farm-crops. Its soil and climate seem particularly suitable for the production of beans and small fruits. One settler grows a crop of Mexican beans yearly, and finds a quick market at four to five cents per pound by the sack. An industrious Italian located land years ago, and, finding water in a well, began to raise vegetables for surrounding mining camps, but insects defeated him. He then tried orcharding, and is getting rich. His peaches are equal, if not superior, to the best California fruit, and in the towns readily bring twelve and one-half cents per pound. In a few years, competition may lower these rates; but as a thousand miners and laborers, getting $2.50 to $3.50 per day, are employed by the Copper Queen, and other mining companies at Bisbee, sixty miles south,—and Tombstone is about the same distance to the southwest,—there will always be a good market for fruits. In two years after being set out, peach-trees begin to bear, and even when they are only six feet in height they are often so loaded down with large red-cheeked globes that the limbs demand support.

The cattle-men make few improvements. At times, a fenced pasture may be seen near to a good house, but more generally small adobe or lumber buildings, some of them with dirt floors, suffice. Gardens are rare, and the family table is quite as likely to have bacon and canned milk upon it as home products. Many of them are in debt to storekeepers, and foreclosures are increasing. The range-cattle business, in an open country where there is no hay for winter use, is at best a wearing one; now, when expenses are scarcely met and there is constant worrying over weather probabilities, it must be surrounded with very trying conditions. Few men can see ruin imminent, and its coming only to be prevented by the uncertainties of pluvial bounty, with entire equanimity. The heaviest outlay is in connection with the "cowboy" work. When a three or four days' fierce wind, with hail or snow, comes, cattle in the valleys keep traveling before it, and when it is over they will sometimes be thirty to forty miles away. If the settlers thus invaded are dependent on wells, they can scarcely be expected to water strange stock, nor will they consent to their own cattle being robbed of grass. The intruders are therefore in most cases run off from one ranch after another, and if they live it will cost about all they are worth to find and bring them back. This, with the ordinary work on the ranch, makes hard times for the cow-ponies, and the cost of graining them is necessarily heavy. They are cruelly ridden, and, being soon worn out, others must be procured. In the spring and autumn round-ups, when cattle are chased for miles by horsemen to corrals, to be "cut out," or separated for their owners, and branded, there is great barbarity displayed.

JOHN D. EMERSLEY, Cochise Co., Arizona, Tex.

Sheep in the Appalachians.

Along the Appalachian and Allegheny ranges, extending from Alabama to the Gulf of St. Lawrence, is a vast area of now waste land, but admirably adapted to sheep-raising. For hundreds of miles there are sloping mountain sides and elevated plateaus, upon which the best grasses can be easily grown. Where the timber is cleared away or deadened by fire, in many places excellent grasses, indigenous to the locality, readily spring up and offer nutritious pasturage. Other grasses spring up among the timber, and with the vetches and usual forest undergrowth, would make fair grazing, and in places excellent grazing, for sheep. South of Pennsylvania, expensive winter protection will not be needed, and yet further south none whatever. A little blue grass pasture and fodder corn, sufficient of which can be grown without difficulty, will bring the sheep through the short winter.

In all this region, sheep-raising, conducted with an intelligent understanding of the peculiar conditions, will yield a handsome profit. One incident will nicely illustrate this: At the National Farmers' Congress held last November at Montgomery, Ala., Mr. Ryals, a Georgia delegate, stated that in October, 1888, his brother, living in the mountains of Virginia, bought a flock of sheep at a cost of $1,017. By August of the next year, he had secured a profit of $600, and then quite a number of lambs were yet unsold. Such results need not be exceptional—they are not difficult. In the region named, sheep can be reared to maturity for seventy-five cents each, and wool can be made for less than ten cents per pound.

Of course the tenderer breeds can hardly be made profitable on these lands. The sheep must be hardy, good rustlers, and not fastidious about their food. It is at once apparent that they must partake of the characteristics of the Merinos, rather than of the mutton breeds. Shropshires can be handled on the better lands, it is true; but the most available sheep must go beyond even the Merinos, in some points. The Scotch Cheviots, now alloyed with English lowland blood, are full tender. For the wilder lands, the best sheep are the Welsh mountain sheep. The Herdwicks, of the north of England mountains, also answer admirably.

To sheep-raising over a good part of this region, there is a serious drawback—the dog. The sheep are now safe in only the more remote regions. Many of the mountain farmers are fond of sport with dog and gun, and in no other part of the country can villages show a larger canine population. Hence, the sheep grower must seek points remote from civilization if his flocks would be secure; and as he extends his grazing grounds nearer the haunts of men and dogs, he must be ready to use often and quickly his gun. The dog nuisance can be abated, and will be abated almost as soon as the mountain farmers are made to realize the capabilities of sheep husbandry in their localities; and this can be accomplished only by actual demonstration. Every flock taken into this mountain region, and rightly handled, will clear the way for other flocks nearer civilization, until in time the dog will give way to the sheep, and plenty will flow into the coffers of thousands of shepherds.

S. M. STAHLES, Greenbrier Co., W. Va.

Southern-Central Missouri.

Wright county is situated in about the center of the State, east and west, and in the third tier of counties from Arkansas line on the south. The farms are, for the most part, gently rolling. We have a good variety of timber, oak predominating. Excellent crops of all kinds are raised in this county. Clover, timothy and all other grasses grow to perfection here. It is a fine country for stock of all kinds, requiring but little feed through the winter. Tobacco is a paying crop. Vegetables of all kinds thrive to perfection. The same may be said of fruit of all kinds. Good improved land can be bought at from $8 to $15 per acre. Situated as we are, between the two extremes of heat and cold, the farmer has a long time in which to do his work. We have an abundance of clear, sparkling water, pure and wholesome. Health is unexcelled in the United States. Wright county has an abundant timber supply, and lumber is cheap. Tramps here are unknown. People from the surrounding States are fast settling in this county. School houses and churches are numerous; and new-comers find the heartiest Western welcome; our society is of the friendliest and best; there is here a chance for everybody; we have here an excellent climate; good homes are within the reach of all, and we only need men of energy to make this one of the best and most desirable places in the Southwest. We have one railroad running east and west through the county, and another is being built, which, when completed, will run through the county north and south. All we need is immigration to open up the wealth that now lies dormant, and cheap land in this county will be a thing of the past.

J. W. STEVENS, Wright Co., Mo.

Horticulture in California.

The grape growers are more hopeful of better wine sales, and most of them acknowledge that the stagnation of last fall in the wine markets was only natural, so much poor and immature wines had been poured on the public here and at the East. The growers must keep their wines longer, and market under their own signatures. The growers of raisin grapes are in high spirits, and are extending their vineyards by every means in their power. The new "Thompson seedless" raisin grape promises to outrank the Muscatels and Sultanas in importance.

The nursery interests of the State are advancing with great rapidity. Notwithstanding excessive freights, trees grown in California, principally near the Bay of San Francisco, go to Washington, Oregon, Idaho, Montana, Utah, New Mexico, Arizona, South America, and many other places. The citrus fruit nurseries have been unable to supply the home demand, and many carloads are on the way from Florida. Prunes, figs and olives are sold out from every nursery in the State. The planting, which has been estimated at a total of 9,000,000 trees, is now going on wherever the soil can be handled, and will not be completed until early in April. The new stock of nursery trees will be started on a more extensive scale than ever before. Every one looks for a year of great orchard

success, and enlarged planting in the winter of 1890-91. Besides, this spring's sales have cut heavily into the one-year-old reserves.

In no other country that I know of is the variety of occupation so great as in California. I once wrote down the chief livelihood of a number of neighbors whom I knew well. The list ran about this way: A raised onions and winter potatoes; B had a strawberry field; C's orchard was all cherries; D grew sugar beets for the factory; E owned warm hill land, and made his living out of early peas: F staid by alfalfa and cattle, and G pinned his faith to corn and hogs; H had a market garden, while I, J, and K were trying the whole gamut of the high-class orchard, from apricots to *Vitis vinifera*.

CHARLES H. SHINN, Alameda Co., Cal.

Live-Stock in Montana.

Montana is a great State, embracing over 400,000 square miles. Much of this vast region is not adapted to agricultural purposes, owing to its ruggedness and altitude; yet a sufficient growth of nutritious grasses makes possible the sustenance of millions of horses, cattle and sheep the year round. Within a very few years much of the land will be under fence and tillage; but for all time to come there must, in consequence of the topographical features of the country, be great stretches in the mountainous parts of the State fit only for grazing purposes. It will be a long time before the country becomes overstocked, although interested parties have been for years and are now raising vicious protests to the effect that the country is overstocked and the business overdone. Does the cattle business pay? Many a man in the East has friends who have gone West and made their fortunes at this business. Economy, industry and judicious investments pay well almost anywhere; but in the Northwest they act like a charm in making poor men speedily rich. How is it that this business pays so well? Because, like good real estate, the value of the stock is constantly increasing day and night, with but a mere nominal expense yearly added to the purchase money. The cattle cost nothing for feed except under unusual conditions. They multiply by natural increase, and increase in weight by growth. The bigger they grow and the faster they multiply the more pounds of prime beef there are for shipment to the leading markets of the country. Calves grow into a nice bank account almost before the incipient cattle man has got over feeling how poverty stricken he was. They can be bought at $5 to $10 per head, and sometimes one can pick up a good bunch of heifers at from $12 to $15 per head by "taking 'em as they come." A young man without capital may go West and work on a ranch at $30 a month and his board. He can at the end of a year have at least $300 clear cash to invest. He buys fifteen two-year-old heifers at $20 each—a high price. The next spring at least ten of them ought to calve. By that time they will all have grown in size to be worth at least $27 to $30 each—that is, they will give $105 on the investment, to which may be added the ten calves when dropped worth $5, making the profit up to $155. The same fall the calves would be worth $10 each. But allowing 20 per cent on the original investment for losses and expenses, which may or may not occur, he still has $95 clear profit for the first year; or over 30 per cent interest on his $300 for one year. Is it any wonder that men get rich raising cattle?

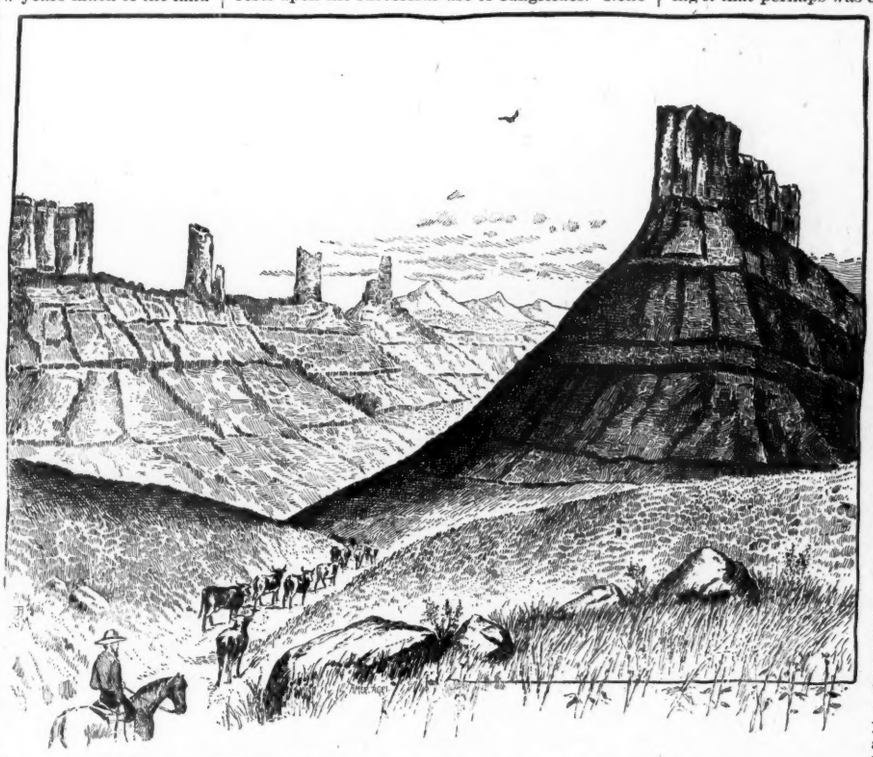
F. W. ANDERSON, Cascade Co., Montana.

Coffee and Tea Culture in Ceylon.

This island is situated between the fifth and the tenth degrees of north latitude, and its western shores just touch the eightieth degree of east longitude. Its climate varies greatly in different situations, according to elevation. In the valleys and lowlands the climate is wholly tropical, while on the sides and summits of the mountains, some peaks of which reach a height of 7,000 to 8,280 feet, there are many degrees of variation.

Agriculture was formerly far more flourishing than at present. The ruins of gigantic irrigation works are found in various parts of the island. A much more recent ruin is that of the coffee industry. A few years ago this had attained great commercial importance. But some twenty years since, a fungous disease attacked the leaves of the coffee trees. About the same time a grub began to work at the roots. It is generally supposed that the latter attack was induced by the weakened condition of the leaf-blighted trees. The disease spread slowly at first, and then with continually increasing virulence and extent, taking off whole plantations, until the coffee business is very nearly swept off the island. The only hope for its revival rests upon the successful use of fungicides. None have been found available, so far. But while coffee has been going rapidly downward, tea culture has grown still more rapidly. The beginning of this industry on a commercial scale was nearly simultaneous with the first appearance of the coffee leaf-blight. It has increased in magnitude until now the annual production is more than five million pounds of Ceylon teas. They have a flavor somewhat unlike the teas of China and Japan, but it is preferred by all who become accustomed to it. There are great agricultural possibilities for this island, but they remain to be developed.

FREDERICK COOKE, Madulsima, Ceylon.



THE SANDSTONE CASTLES ON GRAND RIVER.

Peach-Culture in the Mississippi Valley.

We are living in the Middle West, as I call it. The West of to-day is no longer in the Mississippi valley, but thousands of miles further toward the setting sun. I have been traveling some recently, with a view of changing my location to a place where fruit culture will pay. I think I have found it in Missouri, along the border counties adjoining the Mississippi river. This is peculiarly favorable for peach culture. Shipping advantages are what must be looked to, as to some extent it is true that in Illinois they are more direct with Chicago. But, for the healthfulness of the peach tree, I think Missouri has the best soil. The land is more rolling, with sandy loam and gravel. Stony land is better yet, as it is of a more open and porous nature, favorable for drainage. That is the grand requisite for all fruit-culture. It is not the climate as much as it is the soil and drainage. This part of Missouri is not far from St. Louis, for quick shipment, or to Chicago. For early apples, this section of country can not be beaten. All kinds of small fruits grow as near to perfection as in any other country except California. Now a man with small capital may go to this country and plant say one thousand peach trees, to begin with, of good budded varieties early and late trees. With good care of trees, he can not help but make it profitable in a few years. The frosts are not so liable to kill the peach buds in the spring as farther north. During ripening time the nights are generally cool, but do not injure the fruit on the trees.

P. J. WAGNER, Platte Co., Mo.

The Outlook in Georgia.

I believe that we had generally throughout the State last year the best crop year since the war, and the prettiest and mildest autumn for gathering it that perhaps was ever known in the history of the country. About the 30th of November we had a little ice each morning for about a week, but none afterward, and very little frost. More hogs were raised in this part of the State last year than in any one year for a long time, but there was no weather cold enough to kill and save them during the winter, so the farmers had to feed them right through at a dead expense. We are coming to the front in the pork question. Most of those killed were from a year to a year and a half old, and they netted 250 to 400 pounds each. There is a three-quarter-bred Duroc-Jersey that is expected to net 600 pounds at nineteen months old. It was the first year when farmers have taken any interest in trying to grow their own meat. Rye and oats that were sown in the fall turned out finely. Wheat for the last several years has not done well and the farmers have nearly quit sowing it; but last year's crop was considerably better than usual. It seems hard to get down to the point of success in raising wheat anyhow. If we sow early, the fly sucks it to death, and when sown late the chances are that the rust catches it. A great many remedies have been suggested for both, but none of them that have been tried have succeeded yet.

J. B. BUNTYN, Spalding Co., Ga.

Martin's Pass, Grand River.

One hundred miles below Grand Junction, Colorado, the singular scenery begins to indicate that the wonders of the Colorado are not far beyond. The accompanying engraving is a view of a trail leading from Grand River up to the La Sal mountains. The red sandstone castles are a thousand feet above the valley. Surveyors are now running a line for a railroad through this region. The whole country is wild and wonderful in its scenery. The Colorado Cañon railroad will soon give it great prominence if the Indians can be kept out.

MRS. M. M. RICHARDSON, Emery Co., Utah.

Steady and Marked Improvement.—We have noticed with much interest the steady and marked improvement in your valued journal each month, and desire to congratulate you upon the same, and to compliment your able editorial force upon its most excellent work. Wishing you the success your energies so richly deserve,

FRANK L. BROWN, Multnomah Co., Oregon.

SCIENCE IN FARMING.

Gleanings from the Bulletins.

ALABAMA, No. 14, pp. 40. Professor Lupton finds that much of the nitrogen collected by the peavine is lost when the crop is left exposed in the field. Instead of plowing-under the vines, use them as feed stuff and return the manure from the animals to the soil. Peavines are rich in phosphoric acid and potash, and especially as to nitrogen. The vines are three and a third times as valuable as the roots for a fertilizer.

COLORADO, second annual report, pp. 136. A full account of the year's work is presented, with the plans for the coming season, by each member of the staff. Branch stations are established in different parts of the State, and at these tests are made of various forage plants and garden and other crops. The agriculture of the Centennial State is peculiar, owing to the all-important element in it of irrigation. The irrigation engineer has traversed the State, and makes a valuable report upon water supply, its utilization and many other questions not touched upon at most of the State stations. For a long time the cattle and horses have suffered from locoism, and the veterinary surgeon is making a study of this peculiar trouble among the live-stock of the State. The typographical neatness of this report, if not for other reasons, should commend it to all interested in fine press-work upon station bulletins.

DELAWARE, second annual report, pp. 196. This is a full statement of the station work in 1889. The botanist, Professor Chester, has made elaborate tests of seeds, especially for impurities. Some examples of clover seed contain over nine per cent of impurities, and the weeds present were plantain, ragweed, ribgrass, sheep sorrel, foxtail grass, pigweed, dodder, narrow dock, catnip, and buckwheat. At this rate there would be a weed seed every six inches, in drills nine inches apart. The black rot of the grape is described with several engravings, and the experiments with Bordeaux mixture show that it can be held in check, and the cash benefit thus derived is calculated at $62.62 per acre. In spraying pears with sulphate of potash for the scab with satisfactory results, the cost per tree for spraying was five cents for the season, and the increase in fruit was twenty marketable pears per tree. He did not find bacteria in the tissues of yellowed peach twigs. Twelve plats in various parts of the State are devoted to small fruits. The most injurious insects of the State are illustrated with many engravings and much space is given to insecticides. The chemical work is largely with fodders to determine the basis for control of concentrated food. It was found that grapes not treated with the Bordeaux mixture contained about thirteen parts of copper in a million, and after treatment from twenty-four to sixty parts.

INDIANA, No. 31, pp. 22. This is a statement of the results obtained during the past year in testing varieties. Bubach and Cumberland strawberries lead; Turner and Brandywine raspberries. In potato experiments, the whole tubers did the best for seed and the larger the pieces when cut the better. The relative size and yield is made striking by the use of engravings. Manure, when used, did not increase the scab, but enhanced the yield of the marketable potatoes. The so-called "seed germinator" proved worthless for the purpose intended, and this is only a corroboration of the results at the other stations where this secret "stimulator" was tested.

KENTUCKY, No. 26, pp. 32. The corn experiment described is a continuation of the work of last year, and has been prosecuted to find out, (1) the effects of leading plant-food elements on the crop, (2) the permanency of effect of potash fertilizer, (3) the relation of fertilizer to shrinkage and to proportion of kernel to cob, and (4) the influence of the amount of fertilizer used upon quantities of phosphoric acid, nitrogen and potash taken up by the crop. There was a profit in every case where potash was used and largest where this was used with nitrate of soda. The fertilizer applied last year holds over and favorably influences the crop the next season. The per cent of corn to cob remains quite constant, but there is a wide range of variations in shrinkage; for example, the lowest is 12.3 per cent with nitrate of soda and dissolved bone black, and greatest, 29.5 per cent, with land plaster alone. In no instance was as much potash or phosphoric acid taken up as was applied, but sometimes three times the amount of nitrogen.

MASSACHUSETTS (Hatch station), No. 8, pp. 24. The results of the second season of experimentation with hot water *versus* steam for heating greenhouses are given, and they agree with those found the previous year, that it is much cheaper to use hot water; for it requires only about two-thirds as much coal as for the steam heat. The observations upon peach yellows bring the following conclusions: The nature of the disease is unknown; but it can be largely controlled by cultivation and fertilizers. It is best to destroy badly diseased trees. There were no indications that the trouble is contagious. The second part of the bulletin is occupied by a paper upon how far a cow may be tuberculous before her milk becomes dangerous as an article of food. Milk of a diseased cow may contain the virus of the disease whether the udder is infected or not. No lesion of the udder is required for the milk to be contaminated, for, in a large proportion of cases, the milk is affected when no lesion exists in the udder.

MASSACHUSETTS (State station), seventh annual report, pp. 334. A large part of the volume is occupied as usual with tables of analyses of fodders and fertilizers; the former in connection with the various feeding experiments with pigs and cows. Corn ensilage proved best when fed in the hay. Feed young pigs bulky food, to extend their digestive organs. It does not pay to grow exceptionally heavy hogs. Protect all fattening animals against storms. The botanist gives a general account of fungi. To combat these microscopic enemies of the crops requires "promptness, cleanliness, intelligent treatment and coöperation." Deep planting diminishes potato scab; barn-yard manure seems to increase it. Scabby seed is not worse than smooth potatoes. The feeding experiments proved that the cost of feed for milk is less for green fodder than a hay ration, and the quality remains quite constant.

MISSISSIPPI, second annual report, pp. 44. Director Tracy reports upon 25 varieties of cotton, 44 sorts of corn, detailed in tables, and 25 kinds of sugar cane. The bulk of the pamphlet is taken up with the results of extensive tests of forage plants, many from foreign countries. Among the most promising plants are orchard grass, Japanese rye, Indian burr grass, Japan clover, burr clover, and Chinese vetch. The Japan clover (*Lespedeza striata*) requires special machinery for securing the seed, and the station is perfecting a method for this. Matters concerning cattle-feeding, charbon, and horticultural work fill up the remaining pages.

MINNESOTA, No. 10, pp. 20. It is again demonstrated that onions yield most upon a compact soil. Ground simply harrowed did better than that of the same quality when plowed. The weeds were worse, also, upon the plowed land. Fall plowing of the soil is recommended for onions, as the soil by this means becomes somewhat compacted during the winter. Spraying plums for curculio was successful in a marked degree. Our native plums can be greatly improved by spraying. Bagged grapes were much better in appearance and quality than those normally exposed. Potatoes planted on the surface, also three inches, six inches, and eight inches in depth, yielded respectively 216, 227, 297 and 328 bushels. The increased labor of digging the last plat offsets the increase, so that it does not pay to plant deeper than six inches. A list of eight insects injurious to the oaks is fully treated, with engravings, by the entomologist.

MICHIGAN, No. 59, pp. 42. The first twenty-six pages are occupied with a full list of the fruits for Michigan, with notes on varieties based upon the experience of two or three horticulturists in the State, obtained from replies to a circular sent out by Professor Taft. The choice for a commercial apple orchard seems to be Northern Spy, Red Canada, Baldwin, Rhode Island Greening, Ben. Davis, and Jonathan. Spraying the trees with London purple, or Paris green, one pound to 200 gallons to destroy the codlin moth is proving a profitable practice. The same is also highly recommended for plum curculio, with a weaker mixture of one pound to 300 gallons. Cut off and burn the black knot fungus. This pest is increasing in the orchards of the State. By the aid of two engravings Professor Galloway explains the nature of the apple-scab fungus, *Fusichadium dendriticum*, and prepares the reader for a clearer understanding of the report of Professor Taft upon the treatment of the disease with various chemicals. The injurious effect of the scab is two-fold, reducing the size of the fruit and making the apples unsalable as first-class. Of the five mixtures used, the best results were obtained with the modified *eau céleste*, as follows: Dissolve two pounds of sulphate of copper in hot water; dissolve two and a half pounds of carbonate of soda, mix and add one and a half pints of ammonia; dilute to thirty-two gallons. The next best was three ounces of carbonate of copper in one quart of ammonia, diluted to twenty-eight gallons. A novel way of showing up the results of the sprayed and untreated fruit is introduced—six fruits in a triangle being exhibited in sets as half page engravings with excellent effect.

NEW YORK (Cornell), No. 16, pp. 16. Professors Roberts and Wing conclude that the largest variety should be chosen in growing corn for fodder and ensilage. Heretofore silage corn has been planted too thickly. Corn plants need air and sunspace to make starch and sugar. The plants should be mature at harvesting. The experiments show that the effort should be made to raise the largest yield of grain irrespective of stalks. As a rule, the larger the yield of grain the greater the amount of stover. "The fact should not be lost sight of that wood and water alone are not good foods for animals, and that they are expensive products to handle."

OREGON, No. 4, pp. 36. One-half of this bulletin is occupied by Director Grimm in "Notes on Farm Crops," in which is a report upon a list of fifty-three grasses and forage plants grown in plats the past year. "The grasses deserving special mention as doing well on this land (a heavy clay) are orchard grass, tall oat grass, *Festuca pratensis*, *F. elatior*, Italian and Perennial rye grasses, velvet grass (*Holcus lanatus*) and Timothy." Professor Lake reports upon a long array of vegetables, and lists a large number of ornamental trees started upon the station grounds. Professor Irish as chemist gives the work in his department as the examination of soils, mineral water and wheat analyses, and illustrates and describes an apparatus for determining the fat in plants.

OHIO, second series, Vol. 3, No. 2, pp. 58. Director Thorn gives details of his plat experiments, with a long list of fertilizers and coöperative tests by farmers in various parts of the State. With corn, the superphosphates and potash have not been combined in any case with profit, and nitrate of soda has not paid alone or in combination. Soil that under good conditions will produce fifty bushels of corn is likely to yield a profit for fertilizers applied. On poorer soil, phosphoric acid, as a rule, is the only paying fertilizer. For wheat, it is somewhat surprising to get the following: "The result of six years' work is that, as a rule, no more wheat has been harvested from the plats treated with commercial fertilizer than for those receiving no fertilizer, whereas the manures of the farm have produced a marked increase of crops when judiciously used." Some striking double page engravings are given of wheat grown in pine boxes, 18 inches square and one foot deep, and fed with various fertilizers. The conclusion drawn from these box experiments is that, with the present prices of wheat and corn, it will not pay to apply artificial fertilizers to these crops.

RHODE ISLAND, second annual report, pp. 124. A lengthy description of the large farm at Kingston, with large maps, is given. Professor Wheeler, the chemist, is engaged in the analyses of feeding stuffs, the digestibility of various plant constituents, their functions in the animal economy, the use of feeding standards, etc. Bee-keeping has received considerable attention. Prof. Cushman shows that bees are of great service to crops as agents in conveying pollen, as well as profitable for honey and wax. Extensive tests of potatoes as to best size of seed, and variety least subject to rot, are being made, but run on for other years.

SOUTH DAKOTA, No. 18, pp. 8. The life history of the cut-worm is given and many remedies proposed, such as soaking the seed corn in brine, placing salt in the hill, watering, covering with straw, digging out by hand and using tin shields.

TENNESSEE, second annual report, pp. 16. The work of the past year is briefly outlined by each member of the staff. In agriculture, the chief work has been upon fodders and potatoes. The chemist made a study of the feeding value of the waste products of the cotton plant. In botany and horticulture, a "grass garden" was started, and the economic grasses of the State are being tested; also the various plant diseases, especially those of the grape. The entomologist has tested various substances for insect pests, and worked upon the nematoids of the potato.

FARMING IN FOREIGN LANDS.

Much separated milk is being sold in London as the pure article. For each offense of this kind a fine of $100 will be imposed or an imprisonment of two months.

The wheat crop of 1890 in New South Wales is the greatest ever produced, the 407,400 acres yielding 6,460,000 bushels, or an average of nearly 16 bushels per acre. In 1889 only 1,450,503 bushels were grown on 304,803 acres. The greatest production in any previous year was 5,868,844 bushels in 1887, of which a million bushels were unfit for human food.

Much diseased beef, mutton, pork, and veal has been seized lately in Edinburgh. The illegal and dangerous traffic in ham has also been general, and one member of the city council has brought to public notice a case where in one warehouse sufficient unsound ham has been found to poison seven thousand people. The inspectors have been instructed to make a methodic and systematic inspection of provision warehouses, and to put an end to this evil.

To encourage the exportation of meat, the Argentine Republic has offered a premium of five per cent on all capital employed for this purpose up to eight million dollars. The annual surplus production of meat in that country is 730,000 tons, of which 15,000 tons are exported. The remainder is sold at about four cents per pound—lower than in Australia, Texas, or New Zealand. The exports last year were one and a half million carcasses of frozen mutton, against 17,000 in 1883, two-thirds going to England, and the rest to France. Frozen beef is not yet exported.

The results of the coffee experiments carried on for some years on the Mergui plantation in Burmah have not been very satisfactory. Liberian coffee was more successful than the other varieties, though, on account of the white ant pest, the crop was less for 1889 than the previous year. Arabian coffee proved a complete failure, and experiments with it have been abandoned. Great difficulty has been experienced in introducing the coffee for sale because of the suspicion that had been aroused among the natives by selling the first year's crop improperly prepared.

Farmers about Glasgow and Aberdeen have made a good profit in importing store cattle from Canada, to be fatted for the local market. Dundee farmers—also those of Newcastle, England—desire to adopt the same practice, but want the privilege of getting their store cattle from the United States. This will necessitate setting aside the order which now compels all cattle from the United States to be slaughtered immediately upon arrival. The farmers and corporations interested at both places are convinced, after expert investigation, that this order is no longer necessary, and have joined in a petition for its repeal.

Indian wheat crop returns show that the area under wheat in the Punjab district for the season just closed was 6,575,600 acres, against 6,919,100 acres for 1889—a decrease of five per cent. In the British districts of Bombay the total area for the same period was 2,230,000 acres, or five per cent below the average. The crop was fair and up to the average in Sind and Karnatak, a little below the average in Gujarat, and comparatively poor in the Deccan. In the Native States the area was 551,000 acres, or thirteen per cent below the average. In Berar 844,336 acres were planted, being ten per cent less than last year.

At a recent special meeting in England of the Liverpool and District Farmers' Club, to consider the question of agricultural depression, the principal causes discussed were the low prices brought about through unfair foreign competition, exorbitant market tolls, and disappointment in legislation. Among the remedies suggested were the formation of some sort of council, whose duty it would be to carefully consider all the difficulties at present contended with by tenant farmers, the representation of farmers in the House of Commons by farmers and nobody else, and to induce landlords to abate rents.

It seems to be somewhat difficult to come to a unanimity of opinion on the lawfulness of dehorning in the courts of the three divisions of the United Kingdom. Some five years ago a judgment was given against the practice in Ireland, but it was reversed in the following year in relation to another case. In England last year dehorning was declared illegal under the Prevention of Cruelty to Animals Act. On the other hand, one of the Scotland courts has just given decision in favor of the legality of the practice. In order to obtain a clear decision from the Irish Queen's Bench, the Irish attorney-general has instructed the police to prosecute any one found to perform the act of dehorning in that country.

The rabbit pest in Australia is being turned into a source of profit. A big company, to put up canned rabbit meat, is already canning 44,000 rabbits a week, at Stony Rises, Heriot district, New South Wales, and another is being started at Tuopeka. The rabbits are first scalped, the head and legs cut off, and then skinned. Then they are cut up, steeped in brine, washed in one or two waters, parboiled, and pressed into tins. These are headed—a small hole being left in the top—and placed in wooden vats containing a chemical preparation, which is kept at a great heat by steam. They are then removed to a cooling-vat and testing-room, hermetically closed, and packed in the store-room. Each tin contains about two pounds of meat. The skins are a profitable source of income.

Silk culture had a great boom in France in 1853, when the rural classes received $25,000,000 from this source alone. Then everybody rushed into the business, the worms degenerated, disease became rampant, and it was not until 1880 that Pasteur discovered remedies for this disease. Meanwhile silk culture had been largely abandoned, and manufacturers had learned to adulterate their silks with inferior fibers. The lapse of the commercial treaty with Italy excludes its immense exports of raw silk to France, and this, with the growing demand for better silks, has greatly revived the industry. A congress of sericulturists was recently held at Avignon, at which were represented 160 municipal councils, 30 agricultural societies, and 20,000 petitioners, who unite in demanding full protection for their industry and relief of their mulberry plantations from domestic taxation.

The Russian administration in Central Asia has been the means of greatly developing the growth of cotton in that country. In the province of Ferghana no less than 50,000 acres were sown with American seed last year, while in other provinces, also, the culture of this crop has largely increased. This is especially true of Bokhara, Khiva, and Tashkend, which exported last year 122,000, 57,000, and 180,000 bales, respectively. This has caused Indian cotton planters much concern, as their product, of which large shipments had hitherto been made to Odessa, is in danger of being entirely supplanted by the product of Asiatic Russia. While at present the Asiatic staple is too irregular, and the fiber too dry and weak for the better class of yarn, the Russians have great expectations in regard to the future quality and quantity of their crops, and boast that before another ten years are over they will be entirely self-supporting.

A movement is now under way in India to revive the once prosperous ramie industry in Burmah. This fibrous plant, originally introduced from China, was for some time confounded with China grass, both plants being of the nettle order and of considerable size when improved by culture. But while the ramie has grayish green leaves, those of the China grass are silver white. Besides, the fiber obtained from the ramie is far superior in beauty of color and strength of texture. Indeed, with regard to its value, ramie produces a finer and stronger fiber than flax, hemp, or cotton. This crop is particularly suited to the light soil and warm climate of parts of India and Upper and Lower Burmah, and it has been estimated that a plantation of five acres in that country will nourish 80,000 plants, and that the produce of three cuttings in one year will give 150,000 pounds of stock, or a yield of 3200 pounds of fiber.

In both France and England a large amount of horse-flesh is sold for human food. In the former country there are at least 140 horse-flesh shops in the Department of the Seine. In Paris, 20,000 horses are killed annually for this purpose, the price of the meat being less than half that of ordinary butcher's meat. In England the fat is frequently removed from the meat, and beef fat or mutton fat skewered on to the lean in its place. The horse-slaughterer pays about five dollars a horse. A considerable amount of horse-flesh is imported into Stockholm from Glasgow, to be manufactured into German and Russian polonies. Glue, combs, etc., are made from the horses' hoofs, the hafts of knives from the shank-bones, and Prussian blue from the entrails, while the skin sells for about four dollars. Thus the horse is worth to the slaughterer about four or five times as much as he pays for it.

The first cause of the depression in the hop trade in England, as reported by the committee of the House of Commons appointed to investigate the subject, was the great expense in cultivation. One member of the committee, a prominent hop-grower, stated that the cost of cultivation, manuring, and planting of his hop crop the first year was $220, from which he received no returns. In the second year the expense, including rent, taxes, tithe, poles, picking, sending to market, etc., was $2750, of which $2550 was for labor, at the rate of $85 per acre. Adding to this his previous year's expenses of $220 would raise the cost for the first two years to $2970, and he sold his crop of seventeen tons for about $1368. Others' experience showed the crop to be enormously remunerative one year, and almost ruinous the next. One parish in the last season lost in wages, by the depression of trade, over six thousand dollars. It was shown that the hop industry was further injured by extraordinary tithe, high railroad rates, fraudulent trade-marks by foreigners, and the extensive use of substitutes in the making of English beer. The committee expressed themselves in favor of an imposition of a duty upon the importation of foreign crops and hop substitutes.

The Indian government is attempting to revive the practically extinguished green tea trade with Afghanistan by showing the ruler or Emir of the latter country how his interests and those of the Indian tea planters can be made to coincide. In order to bring about this equality of interests, it is suggested to have the Emir himself become the proprietor of all the Indian tea that enters his territory, so that the sales-money would enter directly into the royal treasury. If this could be brought about naturally (argue the Indian planters), the Emir would put a prohibitive tax upon all Chinese tea, which at present enters Afghanistan in large quantities on equal terms with Indian tea. This plan would, of course, benefit the planters by giving them a regular and certain customer for their tea in bulk, at a fair margin of profit, and equally benefit the Emir by enabling him to obtain, with much less trouble, a larger revenue return from the tea trade than now reaches his treasury; for only a very small part of the exorbitant transit dues now levied in different parts of Afghanistan on Indian tea reaches the Emir at all, on account of the plundering of the authorized agents as the commodity passes from district to district. This is quite a new application of protective economics.

A considerable impetus has been given of late years to irrigation in Bombay. Of the 27 irrigation works in that country, 25 are storage projects. Of the three large protective works, the principal is the Nira canal, fourteen miles of which were opened during the year, by which 32,285 additional acres were brought under cultivation. The most important effective work is the Mutha canal system, which last year paid 2.35 per cent on its capital outlay. This scheme consists of a large storage reservoir on the Mutha river, ten miles west of Poona. The right bank of the canal passes through the station of Poona, to which point it is navigable, and, in addition to irrigating the very valuable land in its neighborhood, supplies the cantonment with drinking-water. After leaving Poona, the water is carried by two tunnels, to avoid interfering with the parade ground and the civil and military buildings. Between these two tunnels there is a fall which is utilized for raising the water into the filter beds and reservoirs in the higher portions of the town. The left-bank canal is not so large, and extends a short distance beyond the station at Kirkee. This reservoir is formed by a masonry dam, founded on solid rock, and was, at the time of its construction, one of the largest works of its kind in the world. It is 36,000 feet long and 99 feet high, and when filled the area of its water surface is 3681 acres. From experiments recently conducted it has been shown that the necessary amount of water required to irrigate the sugar cane crop was 724,000 cubic feet per acre. The quantity for wheat varied a good deal, from 100,000 to 50,000 cubic feet per acre. Last season the rainfall in Bombay was considerably below the average, and many of the reservoirs were dried up, but the Nira canal proved of great service.

Delighted With It.—I was advised to subscribe for the AMERICAN AGRICULTURIST, and am delighted with it. It surpasses any paper of its kind I have as yet seen.
JOHN CONDIT SMITH, Morris Co., New Jersey.

OUR BASKET.

Eradicating Weeds.—Geo. P. Tippenhauer, Campbell Co., Ky.: The only effective means of killing out iron-weed, "white-top" and other perennial weeds is persistent cultivation. Break up the meadow and put in hoed crops for two or three years, or summer fallow, before it is seeded down again.

Egg-Eating Hens.—Miss Van Winkle, Hancock Co., Me.: The best remedy is to eat the hens. But if you wish to try experiments, feed the fowls meat scraps two or three times a week. Or better is, have a chunk of scrap-cake where hens can help themselves.

Poison Ivy.—Alsike Clover.—G. A. Fisher, Lycoming Co., Pa.: (1) The poison shrub is *Rhus toxicodendron*, commonly called "poison ivy." The roots can be torn out by a plow with a sharp coulter and a good team. Re-plow as often as fresh leaves appear, and it will soon be killed out. (2) Alsike clover succeeds best in moist ground, and would make very small growth on a dry hill-side.

A Good Opening.—W. H. Robinson, San Diego Co., California, writes us that the rose geranium grows in his region in abundance all the year around without irrigation, and he thinks there might be a good opening for some one with capital, who understands the distillation of essential oils, to erect a still for the production of rose geranium oil.

Season in Illinois.—R. M. Bell, Macon Co., Ill., writes us under date of May 17: The season here is very peculiar, and has been so since last Thanksgiving, when it was as wintry as any day during the winter. We have had several white frosts during the last two weeks injuring early gardens, and the fruit prospects, especially for grapes, are not very bright. Farmers feel blue about getting a stand of corn. The seed has rotted in the ground, and cut-worms are doing their destructive work. The cold, moist weather has been favorable for the damaged wheat plants, also for oats and grass.

Michigan Agricultural College.—President O. Clute is collecting materials for a history of this institution from its inception, including the speeches and writings which led up to it. He desires all alumni and others who have any facts of interest bearing on the subject to communicate with him. His address is O. Clute, Agricultural College P. O., Michigan.

Flies on Cattle.—W. D., Galveston, Texas: Various carbolic preparations are used to protect cattle from the annoyance of flies. The objection to them and other offensive material is that they interfere with the exercise of the propensity cattle have of licking themselves. In Holland it is not uncommon to see cattle at pasture with thin cotton blankets tied on them. But this, though not expensive, can scarcely be looked for in this country.

An Improved Calf Weaner.—C. F. Barnes, Brown Co., Neb., writes us that he has used the device for this purpose described in the May number of the AMERICAN AGRICULTURIST with success, but thinks he has found an improvement over it. "I make the weaner with three and one-sixth inches between the points which go in the nose. This is so close that it can not be put on in the ordinary way. Therefore, I rip one end with a fine saw, put in a screw, and bore a hole for a six-penny wire nail. Turn the piece partly around, and work it in the calf's nose, then turn straight and put in the nail with a hammer. I always drive a few six-penny nails through the bottom of the weaner to stick out in front, and sometimes drive some in the ends and allow them to stick out about two inches, cutting the heads off with a cold chisel."

Fertilizing Eggs—Ventilation.—H. Crosby, Wayne Co., Ohio: (1) Experiments made by substituting a Houdan cock in place of a Plymouth Rock have shown that eggs laid after the fifth day from the change produced Houdan chicks. Something, however, depends upon the stage of progress of the eggs in the ovary. (2) In winter it is best to have the ventilator flue extend down to the floor to avoid draughts; but in summer the ventilation should open near the roof. (3) Fifty chicks from sixty-six eggs is an excellent result for the first trial of an incubator made by yourself after directions contained in the book "Profits in Poultry."

How Many Eggs?—Henry H. Cammann, Bristol Co., Mass.: It is difficult to answer how many eggs per day to expect from 900 hens, well fed and provided with warm quarters and plentiful range. So much depends on the breed, weather, feeding, etc., that no certain estimate can be made. The keeping of 900 hens requires experience. An average of ten dozen eggs per year for each hen is a large one and the greater portion will be laid in summer. From August to November hens are usually moulting and do not lay at all. From November 1st to April are cold months, and hens do not lay regularly. The number of eggs from 900 hens will be proportionately less than from a small flock. Any estimate would be simply guessing, as there are so many conditions. We would suppose that if you secured 300 eggs per day from 900 hens you would have no cause for complaint.

Bogus Stallion.—N. Tucker, Erie Co., Pa.: The stallion is undoubtedly a fraud. The horse of that name and number is dead. Better let bogus and scrub stallions severely alone than to patronize them at any price. A well-bred colt costs no more to raise than a scrub, and the former may be worth a good price, but the latter never will.

That Ten-acre Lot.—J. M., Lycoming Co., Pa., kindly points out an error of the types in a paragraph about "Land Measurement," on Page 286 of our May issue. The correct measurement of a field five acres long and two acres wide is 1,045 feet seven inches long by 417 feet five inches wide.

Wild Potatoes.—H. B., Nyack, N. Y.: We have read the article to which you refer in regard to the potato; but the man who wrote it had been misinformed, for the original of our common potato is still growing wild over thousands of acres, from Colorado to the Andes of South America. It is indigenous to the high and cool regions of the mountains and valleys. During long and severe droughts, which often extend over a period of two or three years, not a tuber sprouts; but when rain comes in abundance in spring, the wild potatoes come up, grow, and bloom profusely. In some regions the flowers are pure white, while in others this is an exception, and the reddish purple predominates. There are also different colored tubers, as in our cultivated varieties, but they are mainly small—rarely more than one inch in diameter.

Tips.—W. F. Cannon, Posey Co., Ind.: Tips are small plates covering the toe and part of the quarters of the horses' feet instead of shoes. In fact a tip may be regarded as a shoe with the heels left or cut off. The advantages claimed for tips are that they permit the heels and frog to come to the ground at every step, giving a firmer hold for the foot and expanding the heels naturally. When used tips should be rather light, without calks, and let well into the hoof, while the quarters and heel are unpared, so that the tips and heels shall be on a level.

Fertilizers for an Orange Grove.—A. B. Chapman, Los Angeles Co., Cal., wishes to know whether it is to best keep an orange orchard cultivated, or sow it to clover and let the crop remain on the ground; also how much nitrate of soda and superphosphate of lime can be used profitably. Our farmers frequently seed down their orchards with grass and clover, but the general experience is in favor of keeping the land uncropped. On our own farm we have one apple orchard that is kept in grass, and closely pastured with sheep. It is also top-dressed occasionally with manure and nitrate of soda. We have trees of the same age in cultivated ground and think on the whole that sown in the pasture gives the better fruit. We think the reason why grass when grown for hay is so injurious to orchards is due more to the large amount of water taken out of the soil than from the plant-food that it removes from the land. When the grass is kept eaten down to the ground all through the season the probability is that far less water is evaporated through the leaves of the plants than if they are allowed to grow. As the orchard in question is irrigated the clover might not injure the orange trees by robbing them of water. If the clover roots go deeper into the soil than the orange tree roots the clover would undoubtedly bring up nitrogen and other plant-food from the subsoil and when allowed to rot on the land would enrich the surface soil. The plan is surely well worthy of trial. Five hundred pounds per acre of superphosphate is a liberal dressing. More would do no harm but would probably do no good unless it also contains nitrogen as well as superphosphate. Using an ordinary commercial fertilizer in excess of five hundred pounds per acre in order to get more nitrogen is a waste of money. If more nitrogen is needed buy nitrate of soda.

Binding-Twine.—W. McNeely, Saline Co., Mo.: We do not know who manufacture machinery for making "binding-twine" for grain, but we know that there are large quantities of the twine made in this country and we think a considerable portion in the Western States. One Western firm manufacturing reapers and self-binders make their own binding-twine, but whether from hemp or some other fiber we do not know. If you will take the trouble to inquire of dealers in twine at St. Louis you can probably ascertain where the manufactures are located.

Storing Furs, etc.—Mrs. M. B. W., Paterson, N. J.: The use of camphor gum, black pepper, carbolic soap and similar materials to prevent the common clothes moth and buffalo beetle getting among furs and woolen goods during the summer months is entirely unnecessary if you will take the trouble to store in tight cotton bags. Insects that feed upon furs, skins, and woolen goods will not touch cotton, and a thin muslin bag is as effective a barrier to their progress as one made of sheet iron. When ready to put away your furs, lap-robes and similar articles used in winter, beat them well to remove the dust and any insect which may have found a lodgment in them, then roll up and pack in large or small cotton bags and after tying up tightly hang up in a dark closet. The bags may be made of strong sheeting and of any size most convenient. We have used such cotton bags for many years, and have never had an article stored in them injured by any insect pest, and when wanted for use they are free from offensive odors.

Barren Grapevines.—F. S. L., Somerset Co., Md.: The pieces of Concord grape-wood you send are large and vigorous enough to bear fruit, but they appear to have been punctured by some insect while they were young and green. We do not know of any species of insect that attacks the young shoots of vines in this manner, for they do not seem to have been seriously injured; merely scarified on the surface. It is quite probable, however, that the fruit is destroyed by the disease known as "black rot," and it may also be infested by the grape curculio. Try dusting the vines just as the new shoots appear with sulphur, and later syringe them with a two per cent solution of sulphate of copper, repeating the application when the fruit is nearly or quite full size.

Melon Worms.—C. H. Geiger, Cobb Co., Ga.: From your description of the "borers" infesting your melons we are inclined to think that the insect is what has been called the melon worm in the South, and a species closely allied to the "pickle worm" (*Phacellura nitidalis*) which has long been troublesome in some of the Western States. The melon worm (*P. hyalinatilis*) has been more or less destructive to muskmelons in the South for the past twenty years, and in 1875 Prof. J. E. Willet, of Macon, Ga., reported that it was very abundant in parts of Georgia and the melons in some fields he had visited were totally destroyed. The worms are of a light yellowish green color, nearly translucent, with a few scattered hairs, and when full grown are about an inch and a quarter in length. The moths are pearly white, somewhat iridescent, except a narrow black border on the wings. No efficient remedy has as yet

been discovered, and it will not answer to use such poisons as Paris green and London purple on melons. Some of the milder and harmless kinds of insecticides might prove efficacious in driving away the moths even if they had no other effect. Try tar-water or some similar innoxious but strong-smelling solution and sprinkle it on the vines as well as fruit, because the worms attack both.

Apple-tree Scale.—Jas. D. L., N. Y. city: The apple-tree twigs show that the trees are stunted in growth, and infested with a minute scale insect known as "Harris's Bark-louse" (*Aspidiotus Harrisii*). This bark-louse rarely appears on healthy, rapid-growing trees, but as soon as the growth from any cause is checked they appear and multiply very rapidly. The best remedy is to prune away at least one-half of the top of the trees in spring, then apply manure liberally to the roots, and remove all weeds and grass from about the stems, or in other words give the trees good cultivation. About the first of June wash the stems and branches with some kind of alkaline solution, a pound of potash dissolved in four gallons of water, or paint all the wood with soft soap, and follow by whitewashing the stems. By such application and treatment you may force the trees to make a vigorous growth and destroy the scale-pests.

Paulownia Imperialis.—Miss H. E. Smith, New York: The very fragrant purple flowers dropping in great quantities from trees in Central Park are *Paulownia imperialis*, a beautiful shade tree, which has been introduced from Japan in 1840. It is hardy in the latitude of New York, and it is easily propagated by root cuttings. In the young plants the leaves are very much larger than they are on older trees, producing a rich foliage effect on the lawn.

Bean Weevils.—D. W. Hodgkins, Worcester Co., Mass.: The beans you send are infested by an insect known as the "bean weevil," a near relative of the well-known "pea bug" or "pea weevil." This pest was first discovered in Indiana about sixty years ago and it has been slowly but steadily spreading over the country ever since. It attacks all species and varieties of the bean and the only remedy thus far discovered is to destroy all infested beans and plant none but sound seed. If infested beans are planted the weevils will escape and come to the surface and remain about the field until the new crop is in a condition for their pestiferous operations. The female weevils deposit their eggs on the green pods and the minute grubs bore through the pods and into the young soft beans within, but the hole they make in their passage is so minute that it closes up behind them, and when the beans are gathered there are no marks left to show the presence of the grubs within. During the winter the grubs pass through their transformation and by spring become full grown weevils.

Tent Caterpillars.—James M. Plass, Oneida Co., N. Y.: There are several kinds of insects known under the local name of "Tent caterpillar," but the one of which you complain is usually called the "Apple-tree Tent-caterpillar," to distinguish it from the "Tent-caterpillar of the Forests," a closely-allied species usually most abundant later in the season. This tent-caterpillar of the orchard is a great pest but one readily destroyed, because when the caterpillars retire into their nests or tents at night, and during rainy weather, the entire tent with its occupants may be pulled down and the caterpillars crushed with the foot or otherwise. With a long slender pole and a small hook fastened to the upper end a man may in a few hours destroy all the caterpillars in a large orchard or on whatever trees and shrubs they appear. This species of caterpillar appears to prefer the wild black cherry tree to any other kind, but if this tree is not at hand it will attack others; consequently, your proposed remedy of cutting down these trees would not answer the purpose. Try to get your neighbors to join you in making war upon these pests by destroying every tent as soon as it is discovered, whether in the orchard or elsewhere. If you have cherry trees too large to climb cut them down, and save the smaller ones as a "bait" for the few caterpillars that may escape your vigilance.

Fly Paper.—P. C. Close, Richmond Co., Ga.: Almost any sticky substance spread upon paper will answer for catching flies, but if you have a soft spot in your heart and do not want to see the flies suffer for a long time, use poison. Cooley's fly paper is made as follows: Take sirup, honey or dissolved sugar and add about one ounce to each pound weight of yellow tersulphide of arsenic and then spread upon paper with a brush. Redwood's fly paper is made by boiling one-half ounce of small quassia chips for ten minutes in a pint of water. Strain and add four ounces of molasses. The flies will drink this and soon die.

Norway Spruce.—J. G. Steffen, Philadelphia Co., Pa.: As near as we can make it out the little fragment you send is from a Norway spruce. This spruce is an excellent lawn tree, but only where the grounds are extensive, for the lower branches will spread at least fifty feet in all directions in from twenty to thirty years. For lawns of moderate extent say from one-half to one acre we might admit one Norway spruce, but not more. The Chinese spruce is a far more beautiful evergreen but not so rapid a grower. We should also want at least one Nordmann's fir, one Cilician fir, one or two Colorado blue spruce and the Colorado black fir (*Abies concolor*). But there are such a large number of handsome evergreens that we could not think of naming only one as the very best. If one's grounds are limited then the smaller kinds may be used for the sake of finding a place for a variety.

Cut-Worms.—George Schall, Berks Co., Pa.: We do not know of any better way of protecting cabbage, tomato and other plants from the depredation of cut-worms than to inclose the stems of the plants with paper. The paper may be applied when the plants are set out or afterward when the cut-worms begin their work. When the worms are very abundant some such protection is necessary, but where only a few appear we keep them in check by examining the plants every morning and killing all the worms found. A few years ago cut-worms were so abundant in our gardens that all early vegetable plants were soon destroyed if not protected, but by persistent warfare on these pests we have so much reduced the number that we set out our cabbages and similar plants without protection. Beans when cut down by frosts in spring rarely sprout or grow again because no buds are formed below the seed-leaves or cotyledons.

Plantain.—Charles A. Bennett, Morris Co., N. J.: The weed now overrunning your lawn and a specimen of which you send is known as the narrow-leaved plantain (*Plantago lanceolata*). It is an introduced weed and appears to thrive in lawns whether the soil is rich or poor, and frequent cutting down with a lawn mower does not kill it out, as we know from long experience. The roots are perennial and for aught we know everlasting. You can kill it out by spading it under and then reseeding your lawn with pure blue grass seed, adding a little white clover if you can get clean seed or you can dig out the plants with a sharp trowel.

Cecropia Moth.—Miss M. M. T., Augusta Co., Va.: The small pieces of a wing you send were not taken from a butterfly but from the hind wings of a female *Attacus cecropia*, a very large and rather common moth. The males and females are similar in color but differently marked, and this is why we know the specimen from which you pulled the pieces sent is a female. In some specimens the wings expand fully six inches. The ground color of the wings is a grizzled dusky brown with the hinder margins clay colored and near the middle of each there is an opaque kidney-shaped dull red spot. The caterpillars feed on the leaves of the apple, cherry and plum trees, also on currant and gooseberry bushes. The caterpillars when fully grown are three inches or over in length, of a fine clear green color, and on the top of the second and third rings there are two large coral red warts. "Harris's Insects Injurious to Vegetation" is an excellent work for one who desires to make a small collection of butterflies and other insects, as it is written in a plain and interesting style. "Packard's Guide" is a longer and more scientific work, but Harris's book seems to please amateurs best.

Watering Horses.—J. H. Parker, Litchfield Co., Conn., writes: There is too little consideration for horses in the way of frequent watering during hot weather. The farmer stops his team at the end of a furrow or swath, runs to the well, and indulges in a refreshing drink of cold water. It does not occur to him to carry a pailful to the thirsty, suffering horses. Most of this neglect comes of sheer thoughtlessness. Frequent watering, even when horses are heated, does no harm if it is not given in excess. A gallon of water is very refreshing to a thirsty horse, and can not hurt it.

Overhead Check-Reins.—Miss E. M. Ellwood, Herkimer Co., N. Y.: You are perfectly correct in your unfavorable opinion of the overhead check-rein. It is an instrument of discomfort if not absolute torture, for which there is no excuse sufficient to justify its employment. If nature had intended a horse to carry its head in the way that device compels, the bones of the head and neck would have been made in one solid mass.

Grooming.—Comparatively few animals are properly groomed. A farmer's son may clean the colt, but the old horse that daily performs the drudgery of the farm seldom has the dust, dirt, and sweat thoroughly removed from his sensitive skin that plays so important a part in his healthfulness. If the importance of grooming could be impressed upon farmers, and they would practice what they learn, it would add many years to the valuable service of farm animals. An important part of grooming is hand-rubbing. The legs of some horses are liable to swell, and there is no remedy so successful as hand-rubbing. The curry-comb should never be used on the bony parts of the head or on the legs. A good bed is not only a comfort to the tired horse, but it also saves much labor in grooming.

Death of an Esteemed Contributor.—Miss Laura A. Beatty, of Galesburg, Ill., died May 29. She was a highly educated young lady. Though an invalid for several recent years, she was a ready and prolific writer. Her contributions to these pages showed marked ability.

A Well-Deserved Honor.—The college of Montana has conferred the honorary degree of Doctor of Science upon our special contributor, Mr. F. W. Anderson, in acknowledgment of his services to botany in developing the flora of the new State.

Cross-Bred Swine.—S. E. Holloway, Fremont Co., Iowa: A cross of one of the large breeds of swine with Small York or Essex would produce pigs which would be likely to keep easy and fatten rapidly, but the carcass would be deficient in lean meat for the present market demands. Such cross-breeds would be very useful for the mechanic or small farmer who fattens one or two pigs for family use; but for the general market not as desirable as pure-bred Berkshires, Poland-China or similar breeds.

Extracting Beeswax.—John M. Hunt, Whiteside Co., Ill.: Where any considerable numbers of colonies are kept, it is best to have a wax extractor, of which there are several different patterns in the market. It consists of a covered tin can, inside of which is set a wire-gauze basket containing the comb to be melted. For a small quantity, put the comb into a small wire sieve with a pan or basin under it to catch the wax and set the whole over a kettle of boiling water until the wax is all melted. The sieve will retain the bee-bread and brood.

Whale-Oil Soap for Potato Bugs.—Levi Bozeman, Lorain Co., Ohio, writes us that he kills Colorado potato beetles by the use of whale-oil soap. It is mixed with soft water to form a strong suds and sprinkled or sprayed. It acts promptly and effectually on the insects without injuring the leaves. He finds it equally satisfactory for clearing out currant, gooseberry and cabbage worms. This has been used for many years as an insecticide.

Ticks on Horses.—D. S. Jennings, Asotin Co., Wash., writes that the horses on pastures having bunch grass are infested with ticks, which makes them dull and spiritless. He asks for a remedy. Sponge the horses with kerosene two or three times thoroughly. The horses should not be made so wet as to take cold. A good plan is to stable the horses till they get dry. Just enough kerosene to moisten the skin and hair is sufficient, more will be harmful.

AMERICAN AGRICULTURIST
FOUNDED IN 1842

JULY, 1890.

A Great Development.

A bill for the further endowment of agricultural and mechanical colleges has been introduced into the United States Senate by Mr. Morrill, the venerable author of the original agricultural college act of 1862. It has been favorably and unanimously reported by the committee on Education and Labor, and as reported is elsewhere printed in full. The italicized portions of the bill as printed cover two amendments which, in the opinion of the AMERICAN AGRICULTURIST, are most important. Certainly the colleges which are to be so handsomely endowed should not exact tuition fees, at least from students of their own State. The proposed reservation of authority by the Federal government in the person of the Commissioner of Education should also be extended to the appropriations for Experiment Stations under the so-called Hatch Act, but in the latter case the Secretary of Agriculture would be the more proper supervisor, as our proposed amendment puts it.

There can be no question that in a few States the Experiment Station fund has been grossly abused, just as in earlier years the Agricultural College grant was so frequently abused, and, in a very limited number of instances, is still misapplied. But, by making it necessary for two government officials to certify that the States are rightfully entitled to receive the fund, by virtue of its legitimate use, as provided in Section 3 and its amendment, a strong safeguard is put up against the misuse of the appropriations. This proposition also commands the support of every one of the benefited institutions, with one or two conspicuous exceptions. They all desire it as a protection for the whole against the abuses which might be perpetrated by one of their number. Under Section 3 the guilty institution could be held to a strict accountability without thereby necessarily bringing odium upon the whole group of these colleges. In other sections of the bill there is an evident purpose to provide for the most faithful carrying out of its provisions. The original measure was faulty in this respect, but has been much improved in committee, and would be further bettered by the adoption of the additions printed in italics. In some States, also, it is painfully apparent that the best results from the fund will only be received by completely divorcing the agricultural college from the literary university or classical institution of which it is now too often a minor appendage. The intelligent farmers must see that this is attended to in the special legislation of their State accepting the proposed grant.

The principle involved (that of a broader development and a wider field of usefulness for these agricultural and mechanical colleges) is one that receives the hearty commendation of the AMERICAN AGRICULTURIST. Each year the best of these institutions are filling more closely the ideal of the education demanded by the active industrial life of our people. Let them be more fully endowed, and they will be still better able to do their great work of educating our farmers and mechanics. Such an educated and patriotic body of producers will ever be their country's pride. This plan is far more comprehensive and sensible than the scheme for a great system of farmers' institutes run by the Federal government, which has been so heartily condemned in these columns.

If the measure can be enacted as printed, or with further amendments to increase or insure its efficiency, it must prove remarkably wise statesmanship. The more intelligent our producers become, the less we shall hear of agricultural depression, and the more prosperous will be our whole country.

Experimenting on the Farm.

Experiment station work, such as plat trials with crops, cultural methods, the value of feeding rations in practice, and such other practical work, as distinguished from that which is purely scientific, should, to reach its highest value, be carried out upon the larger scale of actual application on the farm. The farmers supplement the station work by becoming experimenters themselves and testing upon their own soils and under their own methods of labor and management such experiments as have resulted in apparent success at the stations. While a certain result has been accomplished at the station, there may be a serious question whether it is practicable or profitable for the farmer to follow. It is not desirable for a farmer to produce five hundred bushels of potatoes from an acre if the cost counterbalances the value of the crop.

It is argued that the conditions surrounding actual farm life are such as preclude exact experimentation, but this is not strictly true. In planting an acre of potatoes, one-half the acre may receive a certain amount or quality of manure different in some essential way from that which is supplied to the other half; or the cutting of the seed may be radically different; or the depth and manner of planting, or of subsequent cultivation. Given in the beginning soil of the same general quality or characteristics and such an experiment would be of decided value to the cultivator and to his neighbors whom he would find quite as much interested in it as himself. The same experiment repeated a second year and duplicated possibly by one or more neighbors would go far to settle definitely one or more questions involved in the different methods under which the two half acres were cultivated.

Much has been said as to the value of thin seeding and cultivation of wheat. There could be no better way of interesting a boy in the farm that to put an acre of ground under his especial charge: letting half be seeded and handled in the usual manner, and the other half drilled in very thin, with the drills far enough apart to permit working with a garden cultivator. Let him cultivate this half acre, keeping account of the value of his labor; harvest each half acre separately and compare the product. The actual result would be of more value than any theory, and far better than the demonstration upon a limited plat at a station.

In winter when cows are in from the pasture it is an easy matter to test the comparative values of rations by feeding cows differently which are in separate stalls and noting the effect upon the product. While this may not be done with the arithmetical exactness of a station experiment, it can not fail to furnish knowledge of value to the experimenter.

Without doubt, many hog raisers "feed off" their swine every year at a loss. Many of them would be better off if they sold to a professional feeder at the beginning of the fattening season. But while they make no experiments they continue in the old way, to their annual loss. It would be an easy matter to weigh the drove before commencing to feed. Then to feed them separately from all other stock and to keep an account of the corn fed. The result would be a surprise to many an old feeder. To make this experiment of still greater value the hogs should be weighed at frequent intervals during the entire feeding time, and the loss or gain calculated for each period. Many experiments besides such as are suggested above could be carried out upon the farm. If each of the AMERICAN AGRICULTURIST readers would undertake a single experiment and carry it out faithfully and then give his fellow farmers the benefit of it through our columns it would elicit an amount of accurate information that would be of great and lasting benefit to agriculture.

Changes in the Future.

American agriculture has touched bed rock. Prices of farm lands and of produce can not well go lower. The opening up of farm empires in the public domain has about come to an end. There are still subject to settlement or obtainable at nominal cost vast areas in the West and South, but there is no chance for any such marvelous development of new territory as has characterized the past three decades. More intensive methods will gradually come into general use, land values will rise and produce will command better prices as diversification reduces the surplus in staples.

With this change will come greater demands upon our farmers to hold their own in public affairs and secure absolute justice in taxation and representation. The feeling of unrest among so large a proportion of our farmers to-day is in some degree due to the fact that they have failed to do their full duty as citizens, at least to a considerable extent. If farmers are injuriously affected by the influences which seem to have conspired to advance the interests of capital at the expense of producers, the reason is to be found in the fact that the favored interests have been constantly on the alert while the farmer has raised but an occasional feeble protest. To grapple with the problems that confront him as a citizen, as well as to make a success of agriculture under the approaching changes, requires a far higher degree of education than has been common among farmers in the past. It is in enabling the rising generation of producers to acquire this education that our agricultural and mechanical colleges are to fill so important a place. When the entire body of our farmers possess the intelligence of the constituency of the AMERICAN AGRICULTURIST we shall hear little of the "down-trodden and oppressed farmer."

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ANIMAL AILMENTS.

Stifle Joint out of Place.—John Gordon, Allegany Co., Md., wishes to know if a horse can work with a stifle joint out of place. It is what is called "hipped." The only remedy is in replacing the joint or bone into the joint immediately after injury. After the displacement becomes firmly fixed, there is no cure.

Shoe-Gall.—D. A. Norris, New London Co., Ct., has a valuable horse that has generated a shoe-gall. Your preventive treatment in the boot is advisable and you will doubtless receive great benefit from the use of tincture of iodine daily applied. Have the shoe covered at night with a rubber shoe or bandage, should the boot not perfectly protect the elbow.

Wooden Knobs for Cattle.—Mrs. Hannah Failing, Alameda Co., Cal., has a fine young Ayrshire heifer that has horns turned up at the ends and so sharp as to endanger the other cattle, and desires to know how much it is safe to saw off to render them harmless. Put a wooden thimble on the points, fastened by a pin through thimble and horn, so that the points of the horn do not reach through.

Water Farcy.—Jos. De Hoven, Latah Co., Idaho, has a mare that has a dropsical trouble, causing swelling and discharge from the udder and belly. After foaling the mare refused to own the colt. This refusal was because of the inflamed and painful condition induced by the dropsy. It is desired to know if bleeding would remedy the trouble? To which, no, is replied. Change the feed of the mare. Green feed, a handful of flaxseed in bran at night, with a tablespoonful of glauber salts will be a good alterative. Moderate work will be enough exercise. It is not advisable to again breed the mare at present.

In-turned Horns.—There are many unsightly and goading horns troubling large herds to a greater or lesser degree. Horns of Jerseys, Shorthorns and Holsteins are subject to distortion. Sometimes the horns pierce the forehead, or threaten the eye. These should be sawn or rasped off, so as to prevent pain or injury. To be effectual an inch or two may be sawn off by a narrow-bladed saw, and the end filed or scraped smooth. Crooked or unsightly horns may, when animals are young, be drawn in and down to any desired position and shape with the horn corrector, a patent contrivance similar to that used to tighten a buck-saw.

Thrush.—Jonas Trecher, Nemaha Co., Neb., has a valuable horse that has been confined to the stable from an injury received from jumping upon a stake. After recovering, he finds that his horse's feet are soft and tender, and when raising the feet to examine them a strong, disgusting smell comes from them. The odor where the fingers touched the sole and frog retain the smell even after careful washing. The horse is lamer from the new trouble than from the accident. The horse evidently suffers from thrush, which arises from standing in wet manure. Clean the stable and feet, sprinkle the soles and frogs with powdered oak bark, and keep dry straw under the feet as an absorbent and cushion.

Abortion Among Cows.—This is often a serious evil in herds or dairies. The habit once formed is liable to recur to the same cow, and moreover it may spread throughout the herd. Every precaution should be used to avoid so serious a calamity. The feeding of rye largely, whether whole or in the ground state to cows in calf is not a safe practice, as more or less ergot (spurred rye) is liable to be present in this grain. This does not so especially apply to the feeding of green-cut rye as early fodder, which is one of our earliest and most economical, and valuable fodders in early spring, and particularly when bran and corn meal is also fed. Those who have practiced this method have found a large increase of milk, and the desirable rich color imparted to spring butter. It is not alone the color but also a delicious flavor and aroma enriching the butter which green rye renders long before clover can be utilized, especially in soiling stock.

Poisoned Feed.—Jerome Atkinson, Shawnee Co., Kan., has had the misfortune to have Paris green accidentally poured into the ground-feed box, and the animals fed from the feed-box before it was discovered were all more or less poisoned. He wishes to know what he can do with a large quantity of the poisoned feed. As the quantity of poison is uncertain it will be well to use the ground feed as a fertilizer. The loss in this way will be comparatively light, and no evil results can come from crops thus fertilized. In all cases of poisoning the veterinary surgeon should be immediately called. And if possible the messenger sent for the doctor should inform him of the kind of poison suspected, so that he may supply himself with the proper antidote.

Black-Leg in Calves.—Chas. E. McCorkle, Rockbridge Co., Va.:—Black-leg is a blood disease, and probably due to undrained pastures, or excessive indigestible food or fodder. The mortality in Great Britain from this affection in calves was one in six, but, after the seton in the dewlap was adopted as a preventive measure, but one in three hundred calves were lost. The insertion of a piece of tape through the dewlap, wet in tincture of Spanish flies, or smeared with fly-plaster, and tied, drawing the seton daily so as to keep up the irritation, is a simple remedy in the healthy calves of herds affected. It should be promptly applied to all the well calves, and a change of pasture or food should be made at once.

HORACE EDWARD STOCKBRIDGE.

Hoven in Sheep.—In the latter part of the summer this excessive eating of clover, by turning a flock of sheep upon a young and luxurious growth, causes a dangerous accumulation of gas in the stomach. It is rarely necessary to resort to surgical aid to remove the gas. Yarding the flock without food or drink for a few hours will generally relieve the trouble. A plentiful supply of salt in the yard is also a valuable adjunct to abstinence from food. If, however, there are any of the flock suffering severely, the animals may be relieved by pushing a narrow, sharp blade of a knife in the left side, two inches forward of, and below the hip where the protruding paunch is most prominent. The direction of the blade should be downward, forward, and inward. The trocar should always be kept where sheep and cattle are largely reared.

Spavin.—The Rev. R. H., Waldo Co., Me., has a horse that has a two-year-old spavin in one hind leg, and in the other a more recent development of another. Question 1. Should the horse be worked or not? If there is tenderness and pain working will make him lamer. Question 2. The horse being kept for a friend would it be best to return him? Yes, by all means. It is too risky to have a horse become lamer in one's custody though he belong to a bosom friend. We have known many spavined horses trot fast. Goldsmith Maid was one of these. A horse with a bony spavin in both hind legs, when the disease has ceased and stiffness is the only trouble, may render much service though getting up and down are difficult.

Swelling on the Hock.—Isaac Davis, Rooks Co., Kan., has a four-year-old mare that has a soft swelling on the point of each hock, the size of an egg or larger. It has been there for five or six months; does not decrease. This unsightly blemish is the result of injury or pressure upon the hocks. Strong tincture of iodine daily applied for a week at night, smartly hand-rubbed twice a day may remove the swelling when applied early before the tissues become permanently thickened. Blistering should be resorted to if the former treatment does not remove the swelling to some extent. The result even then may not be satisfactory. Besides being unsightly but little harm will follow. Plenty of bedding should be used in the stall, as lying on hard floor may have been the cause.

Bunches Under the Skin of a Horse.—Pierre Tabot, Ontario, Canada, asks how to cure his horses of little bunches under the skin. These trifling eruptions are common in the spring of the year on horses and cattle from the long use of dry hard fodder which causes incipient indigestion and constipation. Grass is the natural remedy, both the simplest and the best. A handful of glauber salts dissolved in water poured over the feed for a few mornings will remedy the evil. The proper preventive of indigestion, constipation, and eruptions in domestic animals is the feeding of a proper proportion of roots: mangels, parsnips, carrots, and artichokes. Cut hay, or other fodder, wet and sprinkled with bran, fed at night is not only promotive of health of animals, but an economy too often neglected or practiced by breeders and feeders of stock.

Giving Medicines.—Every farmer and horse owner in the country where the veterinarian is not accessible should know how to give sick animals simple remedies, and such medicines as the doctor prescribes. Ordinary fluid medicines may be given from a common, thick, strong bottle. The animal should be backed against the corner of the stall, the head raised just high enough to enable the animal to swallow comfortably. A little practice will enable the operator to perform this as well as any other dexterous art. Gentle firmness and patience will be necessary. If the fluid or ball be placed well back in the mouth so that the tongue can not expel the medicines, and the head and nose held at sufficient height so that fluid will run down by the natural laws of gravitation, the feat will be readily accomplished. Self reliance is an important factor in every vocation, and tact will follow thoughtful practice. To intelligently will, and to do, are essential to every successful human effort. The ball is held between the first and middle finger, and the hand thus made long and narrow so as to reach well back.

Preparation and Use of Mashes.—Mashes are useful feeding for delicate or sick horses and cattle, but the universal rule is, to make them small, and feed sparingly. In fact, in feeding all animals overfeeding should be avoided. When an animal does not eat up the feed clean, that remaining in

(To Page 390.)

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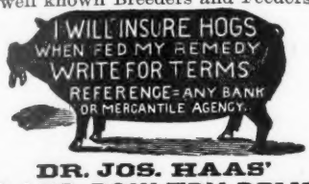

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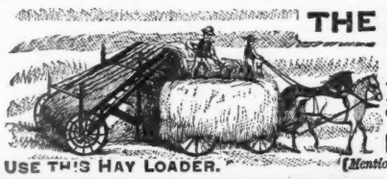

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ANIMAL AILMENTS.

(*From Page 388.*)

the feed-trough should be removed and given to animals who clean out the manger. It is bad practice to place such rejected food in the next meal, as delicate feeders are like overfed children, wasteful and capricious.

Bran Mash.—Put two quarts of good, sweet bran into a pail and pour boiling water over it, mix thoroughly with a clean stick or iron spoon, and let it stand till cool. Man is the only animal who takes kindly to hot food and drinks.

Bread Mash.—Break up a loaf of bread and soak it in fresh milk, and add a little salt. This is a nourishing feed for weak and delicate animals.

Linseed Mash.—Boil half a pound of whole flaxseed in two quarts of water until reduced to about three pints and while hot pour over a quart of bran; mix and feed when cold.

Sweating-Bath for Horses.—The accompanying illustrations represent the constructive details of a sweating-box which is used in the treatment of many veterinary cases. Fig. 1 shows the out-

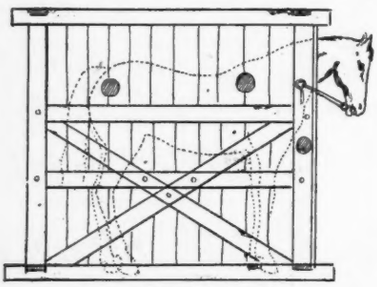

FIG. 1. OUTSIDE OF BOX.

side of the box, and Fig. 2 the inside. As will be seen, there is a frame firmly put together with mortises and tenons. The floor is of planks, and the sides and top of matched lumber. The rear

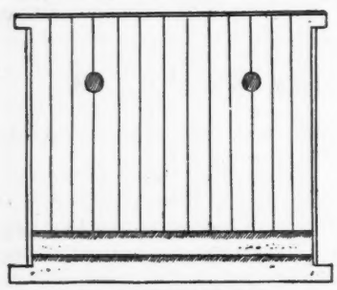

FIG. 2. INSIDE OF BOX.

end (Fig. 3) is closed by double doors, which fit snugly. In the front end (Fig. 4) are two half-doors, above which is an opening, shaped like an inverted gothic arch, for the egress of the horse's head. The usual dimensions are: length seven

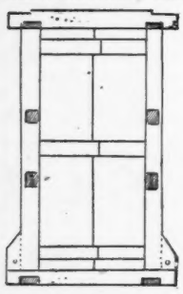

FIG. 3. REAR END.

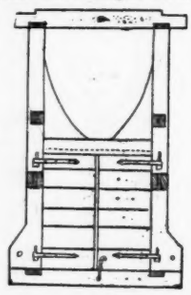

FIG. 4. FRONT END.

feet; width thirty inches; height five feet ten inches. The steam or hot air is conducted into the box by pipes. The animal is led in through the rear doors, which are then securely closed and the heat turned on. It may be steam from pure boiling water, or dry air heated by six to ten alcohol lamps.

Swelling on Lower Jaw of a Cow.—Mrs. C. A. Broderick, Franklin Co., Ohio, has a fine young cow which has always been apparently healthy, that has a swelling on the left side of the lower jaw, well back. Such tumors are liable to appear in young cattle between the ages of two and six or seven years. They are the result of scrofulous or cancerous degeneration of system. At first the glands about the jaws become swelled, hard, painful to the touch, become large, fluctuating tumors, break, and discharge a bloody matter. The bones are liable to become affected, and in this condition pathologists technically and correctly term them *osteo-sarcoma*—bony cancer. As the result of breeding from unsound animals, the herds of our great West, unfortunately, have been tainted. In-and-inbreeding has undoubtedly sown the seeds of disease among the great herds of the plains to an extent that sanitarians should strive to remedy.

Warbles or Wournils in Cattle.—During the midsummer months there are numerous inquiries about bunches on cattle. These are caused by a large fly, called *Œstris bovis*, which attacks cattle, pierces the skin and deposits its eggs in the wound. In a short time a swelling is observed which causes a deposit of secretion from the irritation of the growing larva which has been hatched from the egg deposited. These tumors or bunches may attain the size of a walnut, and when there are several of them on a young and feeble animal they produce a good deal of irritation and fever. Usually nature sets up a discharge through an opening from which the insect is expelled, and, if circumstances favor, it soon develops wings and renews the parental instinct of depositing its eggs in living textures whose temperature hatches the eggs and protects the insect. It is therefore desirable to relieve our afflicted cattle thus attacked by enlarging the opening, and squeezing out the immature insect, injecting oil into the opening, or pulling out the grub by a small, sharp hook. A crude carbolic mixture brushed over the backs of cattle at the time of the appearance of the fly may protect them.

A Well-Equipped Scientist.

Prof. H. E. Stockbridge, the well-known agricultural scientist has just resigned the directorship of the Indiana State Agricultural Experiment Station, and will doubtless accept the proffered presidency and directorship of the agricultural college and experiment station in one of the newer States. Mr. Stockbridge was graduated at the Massachusetts Agricultural College in 1878, and pursued his studies in agricultural chemistry still further as a post-graduate and instructor at the same institution. He was one of the workers in the original sorghum sugar investigations in Massachusetts, and later was a special chemist in a similar line of work at the United States Department of Agriculture. After taking the degree of Ph. D. at Goettingen, Germany, Mr. Stockbridge was elected associate professor of chemistry at the Massachusetts Agricultural College, leaving it to accept, in 1885, the professorship of chemistry and geology at the Imperial College of Agriculture of Japan and chemist of the government. He returned to accept the call to the Indiana Station at Perdue. Prof. Stockbridge has been a frequent contributor to agricultural literature, especially in the way of prize essays on current questions. He is the author of "Rocks and Soils," a treatise on the chemistry of geologic transformation and soil composition, which was honored by an elaborate critical review in the AMERICAN AGRICULTURIST for January, 1889.

The New Industrial Colleges.

The agricultural appropriation bill provides for $15,000 annually for the Experiment Stations in connection with the Agricultural Colleges in Utah and New Mexico as well as the similar institution in each of our States. The New Mexico institution has for President and Director Hiram Hadley; Professor of Horticulture and Agriculture, Ainsworth E. Blount, late of Colorado; Professor of Natural Sciences, Elmer O. Wooton, while provision has been made for a preparatory department and instruction in drawing, music, etc. The institution has a fine farm and a considerable appropriation from the Territory.

The Agricultural College of Utah was founded at Logan City by an act of the Legislature of 1888, with an Experiment Station in connection therewith, the whole being in charge of Prof. J. W. Sanborn, as president and director. One wing of the college building is already built, one hundred feet square. An experiment station building, a farm house, a finely appointed but practical barn and laborers' cottages have been erected. The farm contains 105 acres of available land in the Cache valley. The two institutions are growing up in close harmony with the spirit of the Congressional laws upon which they were founded, and the station will receive the full benefit of the funds given to it. Ninety acres of the land have been improved and seeded. Twenty acres are devoted to a pasture of eight varieties of grasses. Twenty-five acres are cut up into three hundred plats for experiment, and some twelve series of tests with irrigation involving sixty plats are under way. Thirty plats are employed in permanent rotations, while the rest include trials in tillage, manuring, varieties, seeding, etc. The farm as a whole is laid out for a permanent rotation of crops that will render the farm crops proper a part of the experimental inquiry. Prof. E. S. Richman has twelve acres for the horticultural department. The chemical department will be strongly equipped and is in charge of Prof. W. P. Cutter, late of the Cornell station. Other strong workers will be engaged. The college will have a four years' course besides a short course in agriculture of two years. The course is in the closest sympathy with industrial education, but special attention will be given to English and to prepare the farmer for the duties of citizenship. A course in Domestic Arts will be provided for women, covering the dairy, cooking, and other practical work as well as theoretical studies. Courses will be provided in mechanical and civil engineering, and special attention will be paid to irrigation and mining engineering. Beyond French, for those who desire it, the languages will not be taught. With these four courses, it is expected to build up a great industrial institution.

Note and Comment.

A New Secretary.—Mr. R. D. Button, Colton's, N. Y., has been appointed Secretary of the Cheshire Swine Breeders' Association to fill the vacancy caused by the sudden death of Mr. G. S. Button, of Chittenango, N. Y., the former secretary.

American Nurserymen.—The fifteenth annual convention of the American Association of Nurserymen, which was held June 4th, 5th, and 6th, at the Park Avenue Hotel, New York City, was one of the most successful meetings of the society. It was very well attended, and the proceedings were full of interest. The essays and discussions embraced a wide range of subjects connected with the growth, transportation, and sale of nursery stock. A motion to enlarge the scope of the society by adding fruit-growing was fortunately lost, as such a change would surely lessen the usefulness of the organization. Hon. J. M. Rusk, Secretary of Agriculture, visited the meeting on the second day, and expressed his interest in the objects of the Association. The following general officers were elected for the ensuing year: President, S. M. Emery, Lake City, Minn.; first vice-president, J. Van Lindley, North Carolina; secretary, Charles A. Green, Rochester, N. Y.; treasurer, A. R. Whitney, Franklin Grove, Ill.; executive committee, J. Irving Rouse, Rochester, N. Y.; W. T. Peters, Troy, Ohio, and Franklin Davis, Baltimore.

Robbing the Grave.—When Webster's Unabridged Dictionary first appeared, in 1847, it was a great work for the time. But it necessarily contained many crudities, for philology was, in comparison with modern progress, in its swaddling clothes. The intervening forty-three years have been full of intense activity. We have made history rapidly, and with mechanical, scientific, and political development has been a corresponding growth of the language. With laudable enterprise the publishers of Webster's Dictionary have kept it abreast of the times, issuing one edition after another, each one prepared and revised with great skill and labor, and marking a step in the development of the language. The old original edition is as obsolete as a canal packet-boat of forty years ago. It has no value save as a literary curiosity. And now a Western publishing house has, by photo-engraving, reproduced the pages of the old edition, typographical errors, battered letters, and all, and brought out an edition. This is advertised as "Webster's Unabridged Dictionary," the same with intent to deceive. The paper and binding are as bad as the matter is obsolete. Look out for it!

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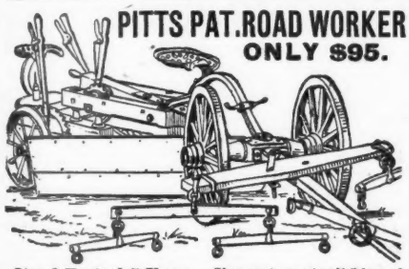

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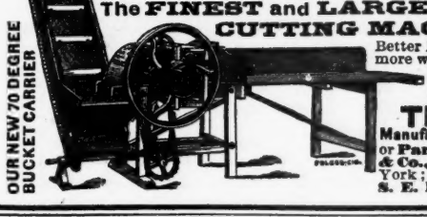

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Recent Publications.

FRUITS AND HOW TO USE THEM: a practical Manual for Housekeepers, containing nearly 700 recipes for the wholesome preparation of Foreign and Domestic Fruits. By Mrs. Hester M. Poole. 12mo, pp. 242, cloth. Fowler & Wells Co., New York.

Fruits, as we are told in Holy Writ, were the primitive food of man. When the first pair were put in the garden to dress and keep it, permission was given them to eat of the fruit of every tree in the garden, with one important exception. But they doubtless ate their fruit *au naturel*. Madam Eve never stood over a hot stove in broiling summer weather canning cherries, or toiled at the kitchen table making apple dumplings. The mysteries of banana blanc-mange and pineapple jelly were unknown to her. But in these fallen days it is important to know how to prepare and serve fruits in palatable and wholesome ways. This little manual is designed to impart the desired knowledge. It tells how to put fruits on the table, and how to prepare the various forms, baked, stewed, canned, jellies, preserving, etc., and how to prepare puddings, pies, sauces, cakes, ice cream, etc., dealing not only with new ways of using well-known fruits, but bringing into notice many fruits that have been deemed of little value. The many delicious desserts that are described make the old-fashioned crusty and heavy contrivances appear unnatural and dyspepsia-creating. Sold by the Orange Judd Co. Price post-paid $1.

THE LIFE OF GEORGE H. STUART. Written by Himself. Edited by Robert Ellis Thompson, D. D. Philadelphia. J. M. Stoddart & Co.

No name was more widely and honorably brought into prominence by the civil war than that of George H. Stuart. He did not set armed squadrons in the field or win bloody victories. But he organized and led an army of mercy which carried its tender ministrations to every field and hospital. The history of the Christian Commission, of which Mr. Stuart was the organizer and president, will never perish so long as human records last. Though his connection with that great work brought Mr. Stuart more prominently into public notice, it was only a part of the works which were the natural fruitage of such a soul. His life was a continual sermon, of which this book is the fitting record. When, toward its close, lying prostrated by infirmities and disease, he acceded to the urgent request of friends to tell the story of his life, and it was taken down by Prof. Gilmore, edited by Dr. Thompson, and constitutes a legacy to all who value consecrated effort and a pure, devoted life.

L'EXPOSITION UNIVERSELLE, par Henri de Parville. Lettre Préface par A. Alphaud. Orné de 700 Vignettes. Paris: J. Rothschild.

This volume of 694 pages sets forth as clearly as can be done with types and engravings the wonders of the Paris Exposition of 1889. The text is clear and lucid, and the 700 illustrations are all good, and some wonderfully beautiful examples of graphic art. To those who attended the Exposition it has many pleasant souvenirs, and, for the immensely greater number who did not, a copy of this book is next best to having gone.

CAPONS AND CAPONIZING. A book for every Poultry Raiser. By George O. Dow. New York: John B. Alden.

This little manual of sixty pages tells, in very simple language, the objects, advantages, and methods of caponizing fowls. Sold by Orange Judd Co. Price post-paid, 50 cents.

MERE MENTION.

Connecticut Bureau of Labor Statistics.—The fifth annual report of this bureau is a handsomely printed octavo volume of 215 pages. The oyster and fishery industries are treated in very lucid and comprehensive style, two handsome colored maps being given of the oyster grounds within the jurisdiction of the State.

Kind Words.

Eclipses all Others.—I have been a constant subscriber to the AMERICAN AGRICULTURIST for over twenty years. While I have always thought it good it now eclipses all others. D. A. NORRIS, New London Co., Ct.

In Ambush for the American Agriculturist.—The only fault I have to find with the AMERICAN AGRICULTURIST is the ladies' pages. I have to spend the entire afternoon on post days in ambush to circumvent my better half on the arrival of the post, and secure the paper.
A. P. HOLME, Natal, South Africa.

A Vast Power for Good.—I note with pleasure the continued high excellence of the old AMERICAN AGRICULTURIST in the great agricultural developments of our country. This noble magazine has done a vast power for good. PROF. T. V. MUNSON, Pres. State Horticultural Society, Texas.

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FULL TEXT OF THE MEASURE INTRODUCED BY JUSTIN MORRILL AND NOW BEFORE THE UNITED STATES SENATE. — AMENDMENTS PROPOSED BY THE AMERICAN AGRICULTURIST IN ITALICS.

A bill to apply a portion of the proceeds of the public lands and the receipts from certain land-grant railroad companies to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July 2, 1862.

Sec. 1. At the close of each fiscal year beginning as of June 30, 1890, the Secretary of the Interior shall cause an account to be held and shall ascertain the total receipts from the sale or other disposition of the public lands of the United States, including all fees received at the general and district land offices during said year, and the amount of expenditures occasioned by the survey, sale or entry, or other disposition of such lands, including appropriations for the expenses of the said offices for said year. He shall thereupon certify to the Secretary of the Treasury the amount of said receipts for public lands after deducting such expenditures. The Secretary of the Treasury shall in like manner, at the close of each fiscal year, beginning as of June 30, 1890, ascertain and add to the sum so certified to him by the Secretary of the Interior all moneys paid, or receipts, into the Treasury, or credits allowed by the United States, to any railroads therein during the then last fiscal year by all railroad companies, or their assigns or successors, named in the act of Congress approved May 7, 1878. The appropriations which are to be made to the several States and Territories under this act for the benefit of colleges shall be made from funds in the Treasury, arising from receipts and credits therein on account of the public lands and railroads aforesaid, so long as such receipts and credits shall be sufficient therefor.

Sec. 2. That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, to be paid as hereinafter provided, to each State and Territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established, or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of $15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriations thereafter for ten years by the additional sum of $1,000 over the preceding year, and the annual amount to be paid thereafter to each State and Territory shall be $25,000. Provided, that no money shall be paid out under this act to any State or Territory for the support and maintenance of a college where a distinction of race or color is made in the admission of students, but the establishment and maintenance of such colleges separately for white and colored students shall be held to be a compliance with the provision of this act. *Provided further, That no tuition fees shall be charged the students from the respective States by the colleges that receive the appropriations herein made.*

Sec. 3. That the sums hereby appropriated to the States and Territories for the further endowment and support of colleges shall be annually paid on or before July 31 of each year, by the Secretary of the Treasury, upon the warrant of the Commissioner of Education, countersigned by the Secretary of the Interior, out of the Treasury of the United States, to the State or Territorial treasurer, or to such officer as shall be designated by the laws of such State or Territory to receive the same, who shall, upon the order of the trustees of the college, immediately pay over said sums to the treasurers of the respective colleges entitled to receive the same, and such treasurers shall be required to report to the Secretary of Agriculture and to the Commissioner of Education, on or before September 1 of each year, a detailed statement of the amount so received and of its disbursement, showing specifically its application to instruction in agriculture and the mechanic arts and the facilities for such instruction, including the various branches of mathematical, physical, natural, and economical science, with special reference to their applications in the industries of life, and a thorough training in the English language. The grants of moneys authorized by this act are made subject to the legislative assent of the several States and Territories to the purpose of said grants: Provided, That payments of such installments of the appropriation herein made as shall become due to any State before the adjournment of the regular session of the Legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof, duly certified to the Secretary of the Treasury.

Sec. 4. That if any portion of the moneys received by the State or Territory for the further and more complete endowment, support and maintenance of colleges, as provided in this act, shall by any action or contingency be diminished or lost, or be applied to any purpose or object other than for instruction in agricultural and the mechanic arts and facilities for such instruction, it shall be replaced by the State or Territory to which it belongs, and until so replaced, no subsequent appropriation shall be apportioned or paid to such State or Territory; and no portion of said moneys shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings. An annual report by the president of each of the said colleges shall be made to the Secretary of Agriculture as well as to the Secretary of the Interior, regarding the condition and progress of each college, including statistical information in relation to its receipts and expenditures, its library, the number of its students and professors, and also as to any improvements and experiments, made under the direction of any experiment stations attached to said colleges, with their cost and results, and such other industrial and economical statistics as may be regarded as useful, one copy of which shall be transmitted by mail free to all other colleges further endowed under this act.

Sec. 5. That on or before July 1 in each year, after the passage of this act, the Commissioner of Education under the direction of the Secretary of the Interior, shall ascertain and certify to the Secretary of the Treasury as to each State and Territory whether it is entitled to receive its share of the annual appropriation for colleges under this act, and the amount which thereupon each is entitled, respectively, to receive. If the commissioner shall withhold a certificate from any State or Territory of its appropriation the facts and reasons therefor shall be reported to the President, and the amount involved shall be kept separate in the Treasury until the close of the next Congress, in order that the State or Territory may, if it should so desire, appeal to Congress from the determination of the Commissioner. If the next Congress shall not direct such sum to be paid it shall be covered into the Treasury. And the Secretary of the Interior is hereby charged with the proper administration of this law, through the Commissioner of Education; and they are authorized and directed, under the approval of the President, to make all needful rules and regulations not inconsistent with its provisions to carry this law into effect. *Provided, That the Secretary of Agriculture shall likewise certify to the Secretary of the Treasury as to each State or Territory whether it is entitled to receive its share of the annual appropriations for experiment stations in connection with said colleges, according to the act of Congress approved March 2, 1887. If the Secretary of Agriculture shall withhold a certificate from any State or Territory of its appropriation the facts and reasons therefor shall be reported to the President, and the amount involved shall be kept seperate in the Treasury until the close of the next Congress, in order that the State or Territory may, if it should so desire, appeal to Congress from the determination of the Secretary of Agriculture. If the next Congress shall not direct such sum to be paid it shall be covered into the Treasury.*

Sec. 6. That the Commissioner of Education, under the direction of the Secretary of the Interior, shall annually report to Congress the disbursements which have been made *under this act* in all the States and Territories, and also whether the appropriation of any State or Territory has been withheld, and if so the reasons therefor.

Sec. 7. That the Secretary of the Treasury shall annually make a detailed report to Congress of the amount of receipts from the sales of public lands and from the railroads, as mentioned in this act, and also of all disbursements to States and Territories made under the same for the benefit of agricultural and mechanical colleges.

Sec. 8. That nothing in this act shall be construed as to affect or in any manner to limit the power of Congress over the public domain or any future provisions of law relating to railroad companies, and nothing in this act shall be held or construed as binding the United States to continue any payments from the Treasury to any or all the States or Institutions mentioned in this act; but Congress may at any time amend, suspend, or repeal any or all of the provisions of this act.

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In early summer the warmer weather is especially weakening and enervating, and that tired feeling prevails everywhere. The great benefit which people at this season derive from Hood's Sarsaparilla proves that this medicine "makes the weak strong." It does not act like a stimulant, imparting fictitious strength, but Hood's Sarsaparilla builds up in a perfectly natural way all the weakened parts, and purifies the blood.

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MATTERS OF BUSINESS.

The Growing Crops.

The statistical returns of June to the Department of Agriculture include preliminary estimates of the area of wheat, both spring and winter, and its condition. While several States increased the area of winter wheat last autumn, the heavy reduction by plowing and planting in other crops, to replace the winter-killed wheat in Illinois, Indiana, and, to a limited extent, in two or three other States, has reduced the acreage in every wheat-growing State of any prominence except Kansas and Oregon. The percentages represent the actual area now growing in comparison with the acreage harvested last year, and include all that was seeded last fall except what has been replaced by other crops. The general average is 91.2, a reduction of 8.8 per cent of last year's winter-wheat area. The percentages of the principal States are as follows: New York, 98; Pennsylvania, 99; Virginia, 97; Georgia, 88; Texas, 75; Kentucky, 94; Ohio, 95; Michigan, 90; Indiana, 89; Illinois, 76; Missouri, 96; Kansas, 109; California, 80; Oregon, 103.

An increase in acreage of spring wheat is reported, except in Wisconsin and Dakota. The percentages are: Wisconsin, 97; Minnesota, 118; Iowa, 104; Nebraska, 105; the Dakotas, 95. There is also increase in Colorado, Washington, and the Territories. The general percentage is 103.8. Taking winter and spring wheat together, the percentage of last year's breadth is 95.4, showing a net loss of nearly one and three-fourths million acres. The estimated area of 1889 was 38,123,859 acres.

Condition of growing winter wheat has declined from 80 to 78.1 since the 1st of May. Slight improvement is noticed in New York and Pennsylvania, and in Ohio and California. Condition of wheat in Indiana, Illinois, and Texas remains at the same low figures of last month. Decline is apparent in Michigan, Missouri, and Kansas, and in nearly all the Southern States. The plants are generally thin on the ground and lacking in development. The patches of bare spots are more conspicuous as the season progresses. The averages of condition of the principal States are: New York, 93; Pennsylvania, 98; Virginia, 87; Georgia, 55; Texas. 67; Tennessee, 72; Kentucky, 86; Ohio, 84; Michigan, 69; Indiana, 63; Illinois, 64; Missouri, 77; Kansas, 80; California, 86; Oregon, 91. The following are some of the spring-wheat percentages of condition: Wisconsin, 82; Minnesota, 97; Iowa, 93; Nebraska, 85; Dakota, 90; Colorado, 99. The average of entire spring wheat breadth is 91.2.

The reported area of oats is 98.7; condition, 89.8. The area of barley is 98.1; condition, 86.4. The area of rye is 98.5; condition, 92.3. The area of clover is 100.7; condition, 95.1.

The returns show an increase of acreage in cotton in nearly every State. The fair price prevailing, with low prices for other products, stimulates the extension of planting. The overflows in Arkansas and Louisiana delayed planting in those States, and prevented the increase which would otherwise have been made. The area, as compared with the acreage of 1889, is reported in this preliminary investigation as follows: Virginia, 98; North Carolina, 102; South Carolina, 103; Georgia, 102; Florida, 103; Alabama, 102; Mississippi, 102; Louisiana, 95; Texas, 105; Arkansas, 99; Tennessee, 100; average, 102. There are locations where replanting to perfect stands injured by cold nights is still continued, and will be, in extreme cases, to June 15.

The stand of cotton is generally very good in the Carolinas, with exceptions in low areas where frost or cool nights have destroyed plants. In the Mississippi Valley and in Texas heavy rains, local floods, and inundations have caused an unusual amount of replanting, and on the Mississippi and other great rivers delay of planting until the waters recede. In such cases the seed has been chopped in the mud and the plants have appeared promptly—sometimes in four days from planting. Except on the Atlantic Coast the excess of rain has retarded chopping out and cultivation, leaving the crop somewhat grassy, though recent fine weather has done much to secure clean cultivation.

In more southern latitudes the plants are beginning to bloom. While the entire breadth, as a rule, is late, the plants are healthy and growing rapidly. The average of condition is 88.8. The percentage of Virginia is 90; North Carolina, 98; South Carolina, 97; Georgia, 94; Florida, 92; Alabama, 93; Mississippi, 85; Louisiana, 84; Texas, 84; Arkansas, 85, Tennessee, 87.

In Detail.

Useful for Hay-Makers. — Wood's Bottom-trip Hay and Straw Sling is a very simple and effective device for handling hay, straw, or corn-fodder. Send for circular to the manufacturers, J. W. & A. B. Wood, Baraboo, Sauk Co., Wisconsin.

A Salary, with expenses paid, will come handy to any one who is now out of employment; especially where no previous experience is required to get the position. If you want a position, see advertisement on second page of cover. "A Chance to Make Money."

A Model Railway.—The Burlington Route, C., B. & Q. R. R., operates 7,000 miles of road, with termini in Chicago, St. Louis, St. Paul, Omaha, Kansas City and Denver. For speed, safety, comfort, equipment, track, and efficient service it has no equal. The Burlington gains new patrons, but loses none.

Rigby Potato Digger.—Maine has achieved two things of interest to potato growers. One was the great prize crop, the other the Rigby Potato Digger. The latter is made and sold by Rigby & Burleigh, Houlton, Maine, to whose advertisement in another part of this issue we call the attention of all potato growers.

Westward Ho!—The near prospect of admission into the galaxy of States has directed special attention to Idaho, with its fine climate, great pastoral and timber resources, and rich mineral deposits. The Board of Trade, of Boise City, Idaho, takes a leading position in bringing these matters to the notice of the public.

Beecham's Pills. — No proprietary medicine sold in this country has a wider celebrity than the English remedy named above. B. F. Allen & Co., 365 Canal street, are sole agents for the United States, and in any case where the pills are not kept by local druggists will mail a box on receipt of twenty-five cents; but it is always best to inquire first.

Phaeton-Carts and Road Wagons.—The Bush Road-Cart Co., of Lansing, Mich., has added to the elegant styles of vehicles formerly made, a handsome and delightfully convenient phaeton-cart for ladies. A new line of road wagons comprises handsome, well-proportioned, graceful and easy-riding wagons, trimmed and furnished in various styles. Send for a catalogue.

Wagons, Harnesses, Furniture.—The Wilber H. Murray Manufacturing Company, of Cincinnati, Ohio, has been conspicuously before the public so long that its admirable methods of business are becoming well known. The "Murray" buggies and harness are marvels of excellence and cheapness, and the parlor suits from the same house are elegant, substantial and cheap.

Something New.—The U. S. Wind Engine and Pump Company, of Batavia, Ill., has introduced an important improvement in pumping apparatus. It is the IXL Cushion Spring for pump rods, which is applicable to all pumps operated by windmills. Its use secures a uniform strain on the mill and pump, preventing sudden jarring, thus adding materially to the life of both pump and mill.

Good Harness Cheap.—D. Rice Kemper & Co., of Cincinnati, successors to the Cincinnati Saddlery Co., conduct their business in a manner which gives every customer a chance "on the ground floor." They sell directly to the consumer at wholesale prices; employ no agents or drummers; pay no commissions, and make no bad debts. Every one who wants harness or saddlery will do well to send to them for a free catalogue.

A Good Fence.—It is reliably stated that the firm of Sedgwick Bros., of Richmond, Ind., have placed in service over 2000 miles of their woven wire fence in the last ten years. Besides being "horse-high, bull-strong, and pig-tight," it is a perfect protection against dogs and coyotes, and in the closer meshes it answers perfectly for poultry and rabbits. Their catalogue, which is sent free on application, contains much very interesting reading for all who keep stock or poultry.

Post-Office Change.—The Post-office Department has changed the name of Spring Mills, Camden Co., New Jersey, to Grenloch. The locality is best known to many of our readers as the home of E. S. & F. Bateman, who manufacture the "Iron Age" cultivator and other very superior farm and garden implements. An extension of P. & R. railroad is completed directly into their works. Their customers and other correspondents will bear in mind the change, and address the firm hereafter at Grenloch, Camden Co., N. J.

The Duncan Fence.—The Wire Fence Improvement Co., of Chicago, has found it necessary to secure larger quarters to supply the increasing demand for the Duncan fence. The factory and main offices are removed to Nos. 87, 89, and 91 Third avenue, retaining, for convenience of local customers, a branch office at 325 Dearborn street. The Duncan fence is well known as a strong, effective, humane, and inexpensive fence. With no barbs, but large wires and steel stay-guards, it is plainly visible, and requires fewer posts than barb-wire.

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The Isthmus of Panama.—Things have changed here greatly. The collapse of the canal company has ruined many, and business is at a standstill. Matters are looking up, however, and there are hopes of a new opening of the works in January next. A commission of distinguished engineers has been here, and we await anxiously their report on which hangs the fate of this gigantic enterprise. I am living on a farm on the banks of the river Chagres, and am gradually turning my attention to botanical work. Of course, I encounter numerous difficulties in the way of classifying plants, etc., as this is almost a virgin flora, and I have not with me sufficient manuals. I am studying the economic botany of this region, and intend making a specialty of the vegetable materia medica. New and rare flowering and ornamental plants are to be had in great quantities. Minerals abound, and afford a very interesting field of study. I am living in the midst of a large supply of quassia, and pay a great deal of attention to furniture woods, dyes, farming materials, etc. I have a specimen of wood somewhat the color of mahogany, very hard and heavy, and close-grained. I have not yet been able to identify the tree. We have here a variety of Jatropha manihot, which seems to contain no trace of the poison found in the others. Boiled or roasted the roots are perfectly harmless. They yield a beautiful starch, which is a valuable nutrient. Large supplies of it are obtainable at small cost.

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There are several of these reprints, differing in minor particulars, but, **don't be duped,** the body of each is a literal copy of the 1847 edition.

WHAT THE PAPERS SAY.

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"Only those who are ignorant of the great advances that have been made in dictionaries are likely to buy this reprint at any price."

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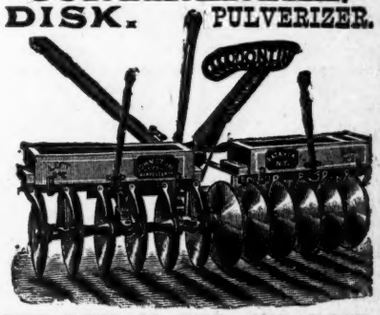

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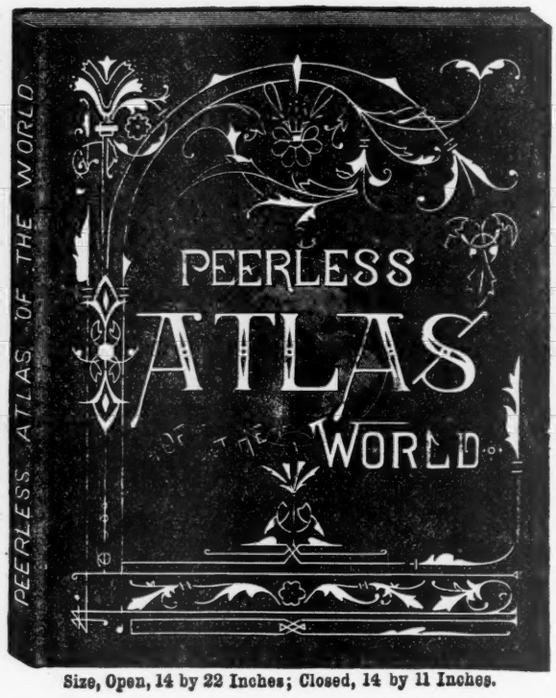

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CONTENTS.

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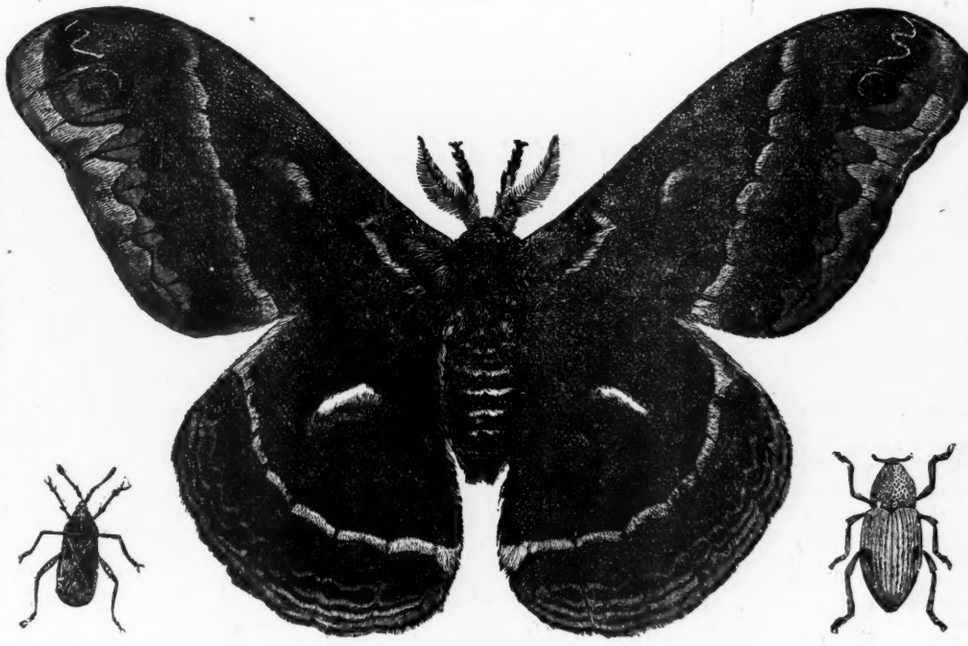
INTRODUCTION.–Insects defined, brain and nerves. Air pipes and breathing holes. Heart and Blood. Metamorphoses or transformations. Classification; Orders and Groups.

CHAPTER II.

COLEOPTERA.–Beetles, Scarabaeians, Tree Beetles, Ground Beetles, Cockchafers, Flower, Stag, Spring, Timber, Capricorn, Leafmining, and Tortoise Beetles, Chrysomelians, Cantharides.

CHAPTER III.

ORTHOPTERA.–Earwigs, Cockroaches, Soothsayers, Walking-sticks, or Spectres, Mole, Field, Climbing and Wingless Crickets, Grasshoppers, Katydid, Locusts.



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CHAPTER VI.

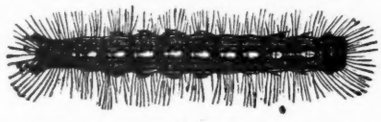
HYMENOPTERA.—Stingers & Piercers, Saw-Flies and Slugs, Elm, Fir, and Vine Saw-Fly, Rose-bush and Pear-tree Slugs, Horntailed Wood Wasps, Gall Flies, Barley Insects and Joint Worms.

CHAPTER VII.

DIPTERA.—Gnats and Flies, Maggots and their transformations, Gall-Gnats, Hessian, Wheat, and Radish Flies. Two-winged Gall-flies, and Fruit-flies.

APPENDIX.

By a resolve of the Legislature of Massachusetts, Mr. Flint was directed to issue a new edition of Dr. Harris's admirable Treatise on Insects Injurious to Vegetation, with suitable additions and illustrations, and was also authorized to use the plates prepared for the edition for the Commonwealth in the publication of one or more editions designed for wider circulation than that for the State could be expected to have. It was thought best to insert the additions contemplated in the resolve in the form of foot-notes. No alterations have been made in the author's language, and the additional notes are inclosed in brackets, to distinguish them from those in former editions. Large additions have been made in the text, however, from the author's own manuscript. These will be found exclusively in the chapters upon the butterflies. Professor Agassiz very kindly offered to supervise the drawings, comparing them with the original specimens before engraving. It is believed that very great scientific accuracy has thus been secured in the illustrations.



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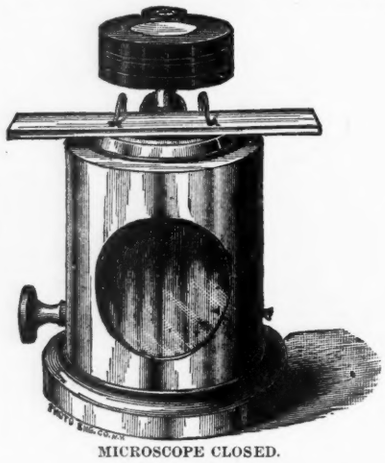

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firmly, having a broad base and contains a circular mirror for concentrating the light, a glass stage, two nickel-plated spring clips for holding the slides, two glass plates or slides, a water proof cell for holding fluids, or small insects, etc., etc.

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SOME OF ITS VARIOUS USES AND SOURCES OF AMUSEMENT.

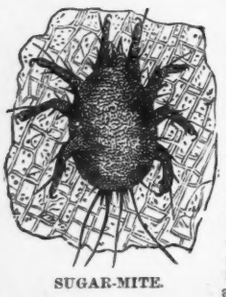
While we are very sure that every intelligent man and woman will find great pleasure in looking at *hundreds* of objects, merely for the sake of seeing how perfect and wonderful are the works of the Creator—we think it proper to here point out some of the many instances in which the Microscope can be turned to a *practical account,* and be really useful as a **Farm Implement,** as well as a **source of amusement** and instruction to the **household.** In the way of

DOMESTIC MATTERS

We may mention the

ADULTERATIONS IN COFFEE, which may be detected by the use of the Microscope. Cheap ground coffee is largely mixed with adulterating material; chicory, peas and ship-bread are the substances most frequently used. Place a very small quantity of the suspected ground coffee on one of the glass slides, and put upon it a drop of water—just enough to wet the particles thoroughly. When this has stood 10 or 15 minutes, put it under the Microscope, and with a pin or mounted needle pick it over, a grain at a time, pressing each grain slightly with the needle. The bits of pure coffee will be found hard and firm, and will not soften with long soaking, while most of the adulterating substances will become soft, and can be readily broken or crushed with a pin, or with a mounted needle.

SUGAR ADULTERATIONS are confined mainly to the powdered white sugar, and do not require a microscope; if a sample does not wholly dissolve in two or three times its bulk of cold water and form a clear liquid, either clay or flour of some kind has been added. But many persons think it cheaper to buy dark colored and unrefined sugars. These are not often adulterated, but are nevertheless very impure, and if examined with the Microscope will often show fragments of cane, sand, and other foreign matters.



SUGAR-MITE.

Some samples will be found to be infested by the *sugar-mite,* a creature which, when seen under the Microscope, is so repulsive that few will careto use sugar containing it. The Mite is most abundant in the poorest sugars, while the partly refined sugars contain but few. In some samples of dark sugar, the eggs and the mite in various stages, up to the full grown animal, may be seen with this Microscope.

Among the forms of

ANIMAL AND INSECT LIFE

that the farmer will naturally wish to investigate are the various parasites on domestic animals. An examination of the **Scab** *insect of sheep* will plainly show that the disease called scab is due solely to this insect, and its proper cure, and the method of preventing its spread, will be apparent. The disease of scabby legs in **fowls,** as may be seen by examining a scale from the legs of a diseased one, is due to a small mite, which has only to be killed, and the disease will cease.

PARASITES. Domestic animals are rarely entirely free from insect parasites; and the dog, cat and chickens will usually reward the searcher with interesting objects. Pet birds, including the delicate Canary, are apt to be infested, each generally having its peculiar insects. When game or other birds are shot, if examined for their parasites, some curious creatures may be found.

THE "GREEN FLY" OR PLANT LOUSE is generally found wherever there are house plants. Being of the color of the young shoot of the plant, unless very abundant, they are not noticed. They may, however, be readily found by using the glasses of the Microscope as a *Hand-glass.*

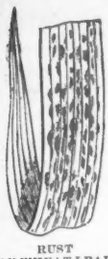
IMPURITIES IN SEEDS, especially those of the clover and grasses, which to the farmer are the most important, are also among the smallest, if not quite the most minute of any he has to sow, and they are the very ones in which it is most difficult to detect any admixture of weed seeds, or to ascertain the *quality,* or proportion of seed to chaff.

CLOVER SEED, for example, appears under this Microscope as in this cut, as well marked and distinct as a bean. If one, by use of the Microscope, learns the shape and appearance of Clover seed (red or white), he can easily detect the presence of any foreign seed—that is, any seed other than Clover, and if anything else be present in considerable quantity, no matter what seed it may be, that sample is one that had better not be sown. No one would willingly sow Clover seed which contained one in a thousand of the seeds of the "Snap-Dragon," ("Butter and Eggs," or "Ramsted weed," *Linaria vulgaris*) or "Viper's Bugloss" (also "Blue Devils," *Echium vulgare*), or yet the Canada Thistle (*Cirsium arrense*) three of our very worst field weeds, and very apt to be sown with clover. When these weeds are once established, the owner of the field would be willing to go to any amount of trouble, and to considerable expense, to get rid of them. *Yet all this trouble and expense may be avoided by the use of this Microscope.*

CLOVER WITH WEED SEEDS.

GRASS SEEDS are apt to be of inferior quality, not so much from impurity as from being imperfect, a large share of what is sold for grass seed being empty and worthless *chaff.* **Every farmer should familiarize himself with the appearance under** the **Microscope** of the **true seeds,** and **also** of those of the **most troublesome weeds.** It is not expected that every bit of chaff will contain a seed, as many seeds in the best grass fail to be perfected, but the sample should be purchased which shows the smallest proportion of empty chaff. It may *be added here that there is no study that the* **farmer** *may take up with more profit than that of the grasses, and this Microscope will be all the aid he will need in examining the structure of even the most minute grasses.*

GRAIN TROUBLES, are in part caused by insects but quite as frequently by minute fungi, which are parasitic plants. These cause the curious diseases known as *Smut, Rust,* and



RUST ON WHEAT LEAF.

Mildew, and are real plants living upon the substance of the grain plants, and propagated, like the grain itself, from seeds (or *spores*) provided by a previous crop. An examination of any of these diseases of grain, even with this Microscope, will show the farmer the fact, which is of **practical interest** to him, viz.: That all these smuts, rusts, and mildews are real plants, living on his grain, and are propagated by bodies answering to seeds. If he would not cultivate these, he must not sow them. Illustrations of the leading forms are here given.

GRAIN MILDEW

RUST MAGNIFIED.

AS AN AID TO STUDENTS.

Those engaged in the study of any branch of natural history will not need to be told how great a help a Microscope like this will be in their studies. For the examination of plants, the dissection of small flowers, and even for the study of mosses, and related plants, we know of no microscope, *for many times its price*, that can answer the purpose so well as this. The great obstacle to the study of botany in schools is the difficulty in providing the scholars with suitable glasses, a difficulty that the easy terms upon which this Microscope may be had effectually removes. It is quite sufficient for the study of any except the very lowest forms of plant life, a department which only a very few specialists take up. Those engaged in the study of insects will find this Microscope well suited to their wants, as will those who need a glass for examining minerals and fossils. But there is a large class not engaged in any special study who will regard the microscope as a source of *intelligent amusement*, and others who will find it frequently useful.

AS AN AMUSEMENT.

There are enough interesting things to be seen with a microscope, without looking for impossibilities, and an instrument of only moderate power, like the one here described, can afford a *vast amount of amusement of an interesting and instructive kind.*

As an example, we show the hairs on a leaf of *Deutzia*, one of our common ornamental shrubs. These *hairs* and *scales* are often objects of exquisite beauty, and an intelligent child will find much pleasure in examining the various leaves, and will dry the most interesting to show to others.

HAIRS ON LEAF OF THE DEUTZIA.

Another class of objects which will afford much amusement to young persons is **seeds**, especially the more minute ones, those of our common weeds being quite as interesting as any. When the great variety these small seeds show under the microscope is pointed out to children they will search for them, and take great interest in collecting them. The common Purslane, or "pussley," has a very pretty seed, and its cultivated brother, the Portulaca of the flower garden, has seeds which shine like jewels, with a beautifully embossed surface, as seen below, while the seed of the common poppy shows a net-work like a delicate carving, as also shown. Other parts of plants will afford objects of much interest.

PORTULACA SEEDS.

POPPY SEEDS.

PARTS OF THE LARGER INSECTS.

The foot of the fly, the bill of the mosquito, the claws of spiders, the antennæ or feelers of various insects, the eyes of the dragon-fly, the wings of small insects, and numerous other objects, are full of interest. Nothing is more striking than the dust on the wings of butterflies and moths. This comes off from the wings at the touch of the finger, and if transferred to a glass, first breathing on the glass and pressing the wing against it, and examined as a transparent object, it will be found to consist of minute beautifully formed scales often showing a great variety of pleasing colors. The scales of fishes, even those of the smaller fresh-water kinds, make very pretty objects, and show delicate and regular markings. During the summer months numerous interesting things especially aquatic animals and plants can be found, which are not always obtainable. When spring opens, the number of interesting objects that young people can find will be almost endless, not only in *plant but animal life*, and every pool or shallow pond will afford a great number of curious forms of both kinds. With a Microscope like this, children, while *finding amusement*, can not fail to *learn something*, and there are few parents, even if they did not feel interested in such things themselves, but would gladly see their children engaged with them. They would feel that the children had found a pleasant diversion, a source of innocent amusement, and that their thoughts were occupied with things at home.

SCALES ON MOTH'S WING.

The Agriculturist Microscope is sent out for just what it is—by far the best simple Microscope ever offered for anything like the price—better than any instrument yet offered for many times the cost, and for the work of which it is capable—is the cheapest and most useful thing of the kind ever known. It is not a compound Microscope, nor will it do the work of one. In selecting a Microscope which should be generally useful, we have given the very best of its kind, knowing that it *will be of more* INTRINSIC VALUE *to those who receive it than a high-power compound Microscope would be* were it possible to furnish one at the insignificant cost at which this is given. We feel sure that the *American Agriculturist New Microscope* will convey real *pleasure* into *every Family Circle*, and prove *a valuable educational agent* through which both *young* and *old* will *learn much* that they *could not otherwise* know of the wonderful things that are *constantly within their reach.*

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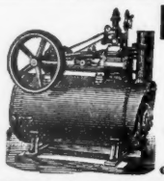

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